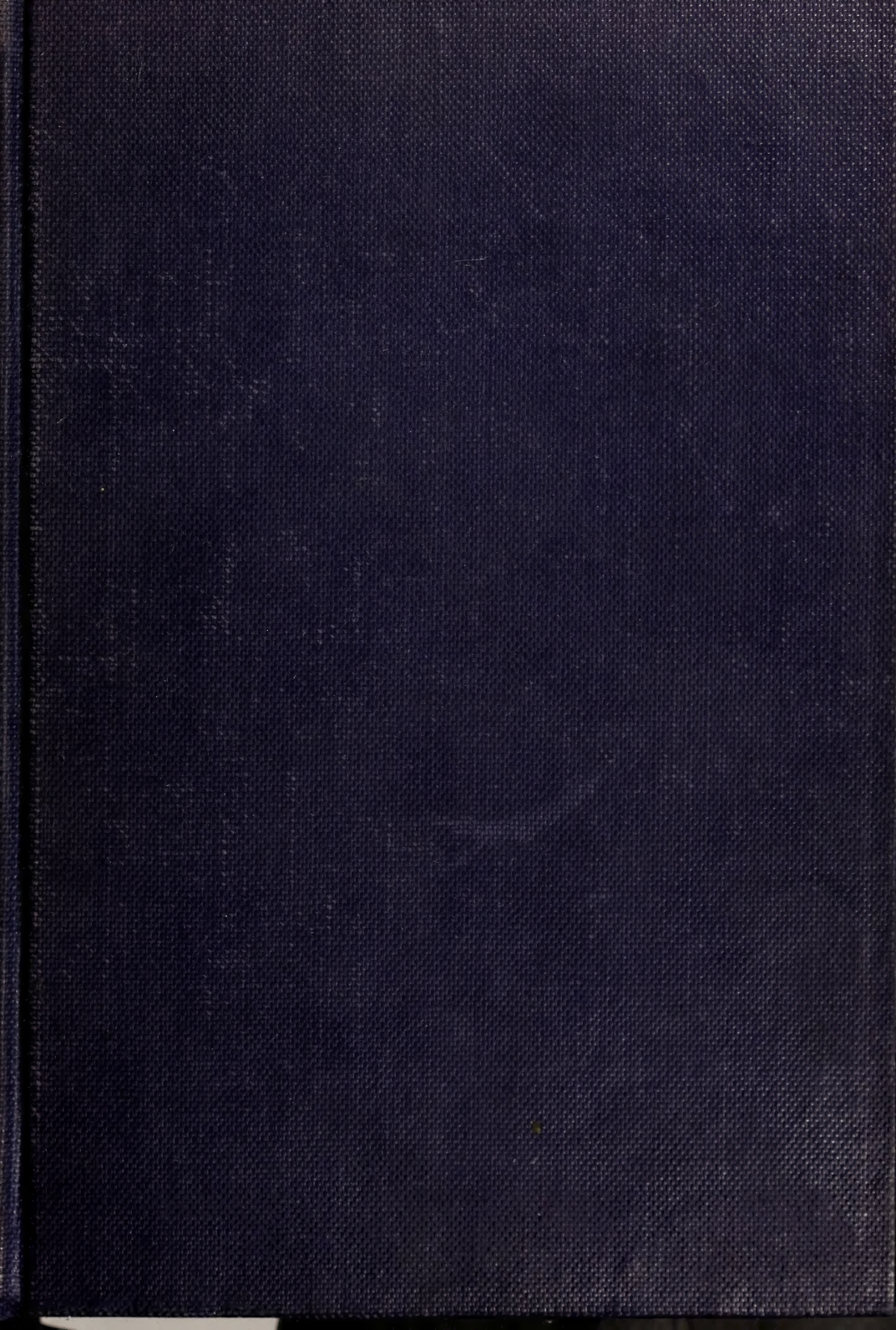




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GENERAL GUIDE.

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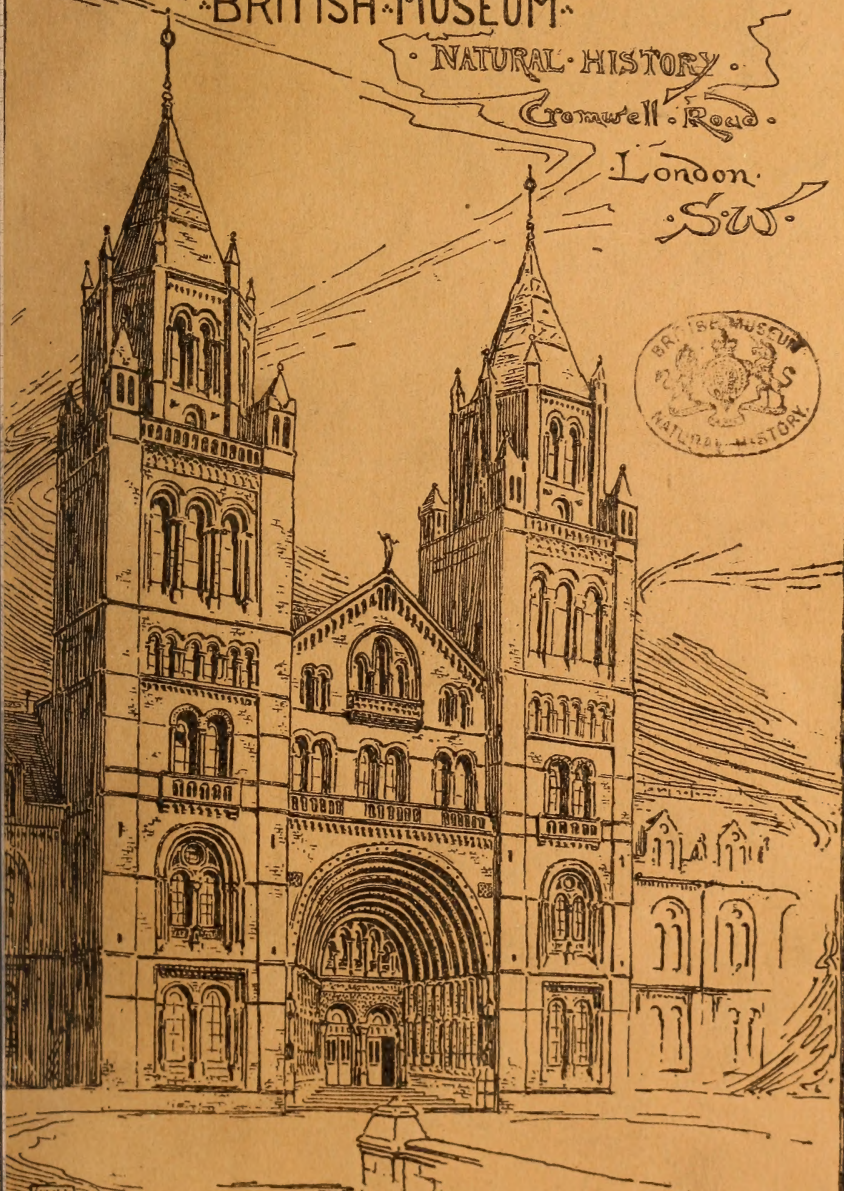
BRITISH MUSEUM.

NATURAL HISTORY.

Cromwell Road.

London.

S.W.



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A GENERAL GUIDE

TO THE

BRITISH MUSEUM (NATURAL HISTORY)

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CROMWELL ROAD, LONDON, S.W.

WITH PLANS AND VIEWS OF THE BUILDING.



[8th ed.]

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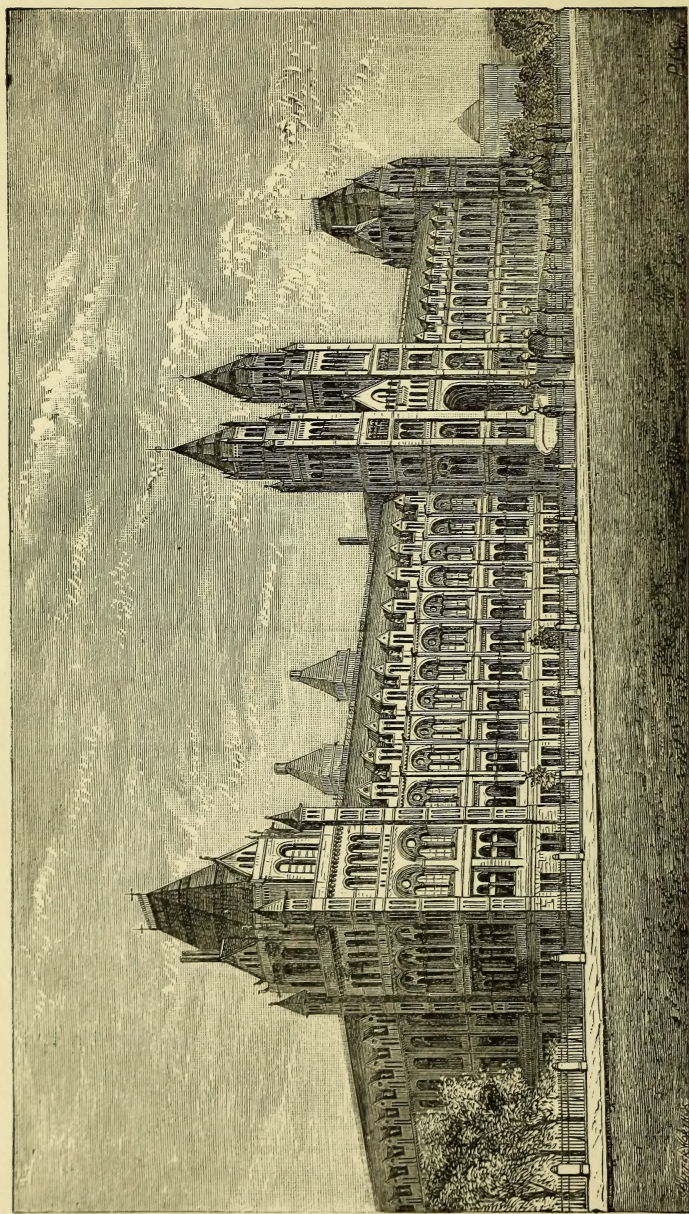
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THE NATURAL HISTORY MUSEUM, CROMWELL ROAD, FROM THE SOUTH-WEST, SHOWING PART OF THE WEST FRONT, NOT YET COMPLETED.

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GENERAL GUIDE
TO
THE BRITISH MUSEUM
(NATURAL HISTORY).

HISTORICAL INTRODUCTION.

THE British Museum dates its actual foundation from the year **Foundation.** 1753, when an Act of Parliament was passed "for the purchase of the Museum or Collection of Sir Hans Sloane, and of the Harleian Collection of Manuscripts, and for providing One General Repository for the better Reception and more convenient Use of the said Collections and of the Cottonian Library and of the Additions thereto."

Sir Hans Sloane, an eminent physician in London, was for **Sir Hans Sloane.** sixteen years President of the Royal College of Physicians, and in 1727 succeeded Sir Isaac Newton in the Presidential Chair of the Royal Society. He was throughout his long life a diligent and miscellaneous collector, having, as stated in the Preamble of the Act of Incorporation of the Museum, "through the course of many years, with great labour and expense, gathered together whatever could be procured, either in our own or foreign countries, that was rare and curious." His collection, which at the time of his death in 1753 was contained in his residence, the Manor House, Chelsea, consisted of "books, drawings, manuscripts, prints, medals and coins, ancient and modern antiquities, seals, cameos and intaglios, precious stones, agates, jaspers, vessels of agate and jasper, crystals, mathematical instruments, pictures, and other things," which latter included numerous zoological and geological speci-

mens, and an extensive herbarium of dried plants preserved in 310 large folio volumes.

According to the terms of Sir Hans Sloane's will, this collection was purchased for the sum of £20,000, far below its intrinsic value, in order "that it might be preserved and maintained, not only for the inspection and entertainment of the learned and the curious, but for the general use and benefit of the public to all posterity."

The valuable collection of manuscripts formed by Sir Robert Cotton at the end of the sixteenth and beginning of the seventeenth centuries, was already the property of the nation, having been presented by his grandson, Sir John Cotton, in the year 1700. The Harleian Collection was obtained by purchase at the same time as the Sloanian, and the three were brought together under the designation of "the British Museum," placed under the care of a body of trustees,* and lodged in Montagu House, Bloomsbury, purchased for their reception in 1754. The Museum was opened to the public on the 15th of January, 1759. Admission to the galleries of antiquities and natural history was at first by ticket only on application in writing, and limited to ten persons, for each of three hours in the day. Visitors were not allowed to inspect the cases at their leisure, but were conducted through the galleries by officers of the house. The hours of admission were subsequently extended; but it was not until the year 1810 that the Museum was freely accessible to the general public for three days in the week, from ten to four o'clock. The present daily opening, with longer hours in summer, dates only from 1879.

At the time of the foundation of the Museum, the site allotted seemed amply sufficient for its purposes; but gradually, as the collections of all kinds increased, they outgrew the limits, not only of the original Montagu House, but even of its

* The Trustees under the Act of Incorporation were the Archbishop of Canterbury, the Lord Chancellor, the Speaker of the House of Commons, the Bishop of London, and the principal Officers of State for the time being; six representatives of Founders' families; the Presidents of the Royal Society and College of Physicians; and fifteen other Trustees to be elected by them. Subsequently, the Presidents of the Society of Antiquaries and of the Royal Academy of Arts, a Trustee by special nomination of the Sovereign, and three more family Trustees were added to the Board.

successor, the present classical building, completed in 1845 from the designs of Sir Robert Smirke. The erection of the magnificent reading-room in 1857 disposed for a time of the difficulty of finding accommodation for the ever-growing library; but the keepers of other departments continued urgent in their demands for more space, and after much discussion of rival plans for keeping the collections together and obtaining the needful extension of room by acquiring the property immediately around the old Museum, or for severing the collections and removing a portion to another building, the latter course was finally decided upon. At a special general meeting of the trustees, held on the 21st of January, 1860, attended by many members of the Government in their official capacity, a resolution, moved by the First Lord of the Treasury, was carried "That it is expedient that the Natural History Collection be removed from the British Museum, inasmuch as such an arrangement would be attended with considerably less expense than would be incurred by providing a sufficient additional space in immediate contiguity to the present building of the British Museum."

Growth of Collections necessitating additional space.

Resolution to separate Natural History Collection.

The House of Commons, in the Session of 1863, sanctioned the purchase of part of the site of the International Exhibition of 1862 at South Kensington, with a view to appropriating it to the purpose of a Museum of Natural History.

Purchase of a Site at South Kensington.

In January, 1864, the Commissioners of Her Majesty's Works issued an advertisement for designs for a Natural History Museum and a Patent Museum, to be erected on part of the land thus acquired, a plan which had been prepared by Mr. Hunt in September, 1862, from Professor Owen's suggestions, being proposed as a model in respect to dimensions and internal arrangement.

Competitive designs.

The plans of the various competitors were submitted to Her Majesty's Commissioners of Works, who awarded prizes to three of the number, giving precedence to that of Captain Francis Fowke, R.E., and then referred the three premiated plans to the Trustees of the British Museum. As the internal arrangements in Captain Fowke's plan did not meet with the approval of the Museum officers, he was desired to modify them in conformity with the requirements of the Trustees. He was engaged in this labour when his death occurred, in September, 1865.

Captain Fowke's plan.

Mr. Waterhouse engaged.

Early in the year 1866, Mr. Alfred Waterhouse was invited by the Chief Commissioner of Works to take up the unfinished work of Captain Fowke; but he found himself unable to complete the plan to his own satisfaction, and in February, 1868, he was commissioned to form a fresh design, embodying the requirements of the officers of the Natural History Departments of the Museum.

Mr. Waterhouse was not long in submitting to the Trustees his plan and model of the building, with a disposition of galleries as required, and these were formally accepted by the Trustees in April, 1868. It was not, however, until February, 1871, that the working plans had been thoroughly considered, and received the final approval of the Trustees.

Completion of building and removal of Collections.

The actual work of erection was commenced in the year 1873, and the building was handed over to the Trustees of the British Museum by Her Majesty's Commissioner of Works in the month of June, 1880. Immediately that the exhibition cases were completed, and the galleries were sufficiently dry to receive the collections, the great labour of removing the Natural History Collection from Bloomsbury was commenced. The departments of Geology, Mineralogy and Botany, were arranged in their respective sections of the Museum in the course of the year 1880, and the portion of the Museum which contained these departments was first opened to the public on April 18th, 1881. It was not until the following year that the cases destined to receive the larger collections of the Zoological Department were sufficiently complete to allow of these collections following, and three more years were required before all the rooms could be brought into a state fitted for public inspection. The last that was opened was the gallery devoted to British Zoology, in May, 1886.

The following description of the structure has been contributed by Mr. Waterhouse:—

Description of the building.

“The New Natural History Museum will, from its position, always be more or less identified with the International Exhibition of 1862, which occupied the whole of the site between the Horticultural Gardens and Cromwell Road. It was at one time thought that a portion, at any rate, of the Exhibition buildings could with advantage have been converted into a Museum of Natural History. Parliament, however,

decided against the preservation of any part of these buildings, and they were accordingly entirely removed.

"In designing the present building, Captain Fowke's original idea of employing terra-cotta was always kept in view, though the blocks were reduced in size, so as to obviate, as far as possible, the objection to the employment of this material, arising from its liability to twist in burning. For this and other reasons the architect abandoned the idea of a Renaissance building, and fell back on the earlier Romanesque style which prevailed largely in Lombardy and the Rhineland from the tenth to the end of the twelfth century.

"In 1873, a contract was entered into by the Government with Messrs. George Baker and Sons, of Lambeth, for the erection of the building at a cost of £352,000. Other subsequent contracts have been entered into by the Treasury, especially one for the erection of the towers, which in the first instance it was decided to omit.

"On looking at the exterior of the building, one of the first **Exterior.** points which strikes a spectator is that the site is lower than the street. This arises from the fact that the whole surface of the ground between the three roads was excavated for the Exhibition building of 1862, and it was not thought desirable, for economical considerations, to refill the space. The building is set back 100 feet from the Cromwell Road, and is approached by two inclined planes, curved on plan and supported by arches, forming carriage-ways. Between the two are broad flights of Craigleith stone steps, for the use of those approaching the building on foot. The extreme length of the front is 675 feet, and the height of the towers is 192 feet. The return fronts, east and west, beyond the end pavilions, have not yet been erected.*

"On entering the main portal, the visitor has before him the **Interior.**
Central Hall. great central apartment of the Museum (170 feet long, by 97 feet wide, and 72 feet high), which it is intended to use as an Index or Typical Museum. The double arch in the immediate foreground which spans the nave (57 feet wide), carries the staircase from

* In judging the appearance of the exterior of the building, it should be remembered that these fronts are required to complete the design, as the externally unsightly brick galleries which run back from the main front, and are now conspicuous when the Museum is seen from either west or east, are intended to be concealed by them (*see Frontispiece*).

the first to the second floor. Opposite the spectator, at the end of the hall, is the first flight of the staircase, 20 feet wide, which rises from the ground to the first floor. The galleries over the side recesses form the connection between the two staircases, and are also intended for exhibition space, as are also the floor of the main hall and the side recesses under the galleries. The arches under the side flights of the main staircase at the end of the hall lead into another large apartment, cruciform on plan, intended for the exhibition of specimens of British Natural History, with an extreme length of 97 by 77 feet measured into the arms of the cross.

Side galleries. "Branching out of the Central Hall, near its southern extremity, are two long galleries, each 278 feet 6 in. long by 50 feet wide. These galleries are repeated on the first floor, and in a modified form on the second floor. They are divided into bays by coupled piers arranged in two rows down the length of the galleries, and planned in such a manner as to allow of upright cases being placed back to back between the piers and the outer walls, so as to get the best possible light upon the objects displayed in the cases with the least amount of reflection from the glass, and leaving the central space free as a passage. Owing to the nature of the specimens exhibited in one or two of these galleries requiring for their exhibition rather table-cases than wall-cases, advantage has only been taken to a limited extent of this disposition of the plan. These terra-cotta piers, however, are constructively necessary, not only to conceal the iron supports for the floor above, but to prevent these supports being affected in case of fire. Behind these galleries on the ground floor are a series of toplighted galleries, devoted, on the east side to Geology and Palæontology, and on the west to Zoology.

Towers. "The towers on the north of the building have each a central smoke-shaft from the heating apparatus, the boilers of which are placed in the basement, immediately between the towers, while the space surrounding the smoke-shafts is used for drawing off the vitiated air from the various galleries contiguous thereto. The front galleries are ventilated into the front towers, which form the crowning feature of the main front. These towers also contain, above the second floor, various rooms for



VIEW OF CENTRAL HALL (1888).



the work of the different departments, and on the topmost storey large cisterns for the purpose of always having at hand a considerable storage of water in case of fire. On the western side of the building, where it is intended that the Zoological collection shall be placed, the ornamentation of the terra-cotta (which will be found very varied both within and without the building) has been based exclusively on living organisms. On the east side, where Geology and Palæontology find a home, the terra-cotta ornamentation has been derived from extinct specimens.

“The Museum is the largest, if not, indeed, the only, modern building in which terra-cotta has been exclusively used for external façades and interior wall-surfaces, including all the varied decoration which this involves.”

The space covered by the building itself, including the detached portion behind, which contains the collections of animals preserved in spirit, is nearly four acres. Space occupied by building and grounds.

The whole ground on which the Museum stands, including the gardens which surround it on the south, east and west sides, is 12 acres and 635 yards. The gardens are open to the public whenever the Museum itself is open, under certain regulations which are posted at the entrance gates.

OBJECTS OF THE MUSEUM AND GENERAL ARRANGEMENT OF ITS CONTENTS.

Use of the
term Natural
History.

NATURAL HISTORY is an old term, used to describe the study of all the processes or laws of the Universe, and the results of the action of those processes or laws upon the materials of which it is composed *which are independent of the agency of man.*

It is thus contrasted with the history of Man and of his works, and the changes which have been wrought in the Universe by his intervention.

This distinction afforded a convenient and rational basis for the division of the numerous and multifarious objects which were collected together in the old building of the Museum at Bloomsbury. When it was decided, for the causes described in the previous chapter, to effect a separation of the collections, those that were purely the products of what are commonly called "natural" forces were removed to the new building at South Kensington, while all those which showed the effects of Man's handiwork remained at Bloomsbury. Like most others of the kind, this distinction cannot be applied too rigidly. Such lines of demarcation almost always overlap. For instance, examples of modification of animal or plant structure under Man's influence will legitimately find a place in a Museum of Natural History, especially as they may afford illustrations of the mode of working of natural laws.

Processes or laws cannot, however, be satisfactorily demonstrated in a museum; therefore such branches of knowledge as deal chiefly with them, as Astronomy, Physics, Geology (in the stricter sense of the word), and the experimental sciences, as Chemistry and Physiology, though essentially belonging to the domain of Natural History, have not found a place here. It is only the results of the working of these processes or laws, as shown in the modifications of the arrangement of the elementary substances of which the material of the Universe is composed

which can be fully illustrated by specimens admitting of being readily preserved and permanently exhibited in a museum. A Natural History Museum, therefore, in the sense in which the term is now usually understood, is a collection of the various objects, animate and inanimate, found upon the earth in a state of nature. It will be readily understood that as the study of such objects is one of the principal means by which the laws which have led to their formation or arrangement may be traced out, it is of the utmost importance for the progress of those departments of knowledge which the Museum is designed to cultivate, to bring together as complete an illustrative series of them as possible.

Although the validity of the old division of all natural objects into *inorganic* and *organic* or *living* has been the subject of some discussion, and although the separation of the latter into *vegetable* and *animal* is perhaps less absolute than was once supposed, yet for practical purposes, MINERAL, VEGETABLE, and ANIMAL still remain the three great divisions or "kingdoms" into which natural bodies are grouped, and this classification has formed the basis of the arrangement of the collections in the Museum.

Division into
Mineral,
Vegetable
and Animal.

I. Inorganic substances occur in nature in a gaseous, liquid, or solid form. With very few exceptions, it is only in the latter state that they can be conveniently preserved and exhibited in a museum, and it is to such that the term "mineral" is commonly limited. The collection, classification and exhibition of specimens of this kind is the office of the Mineralogical Department of the Museum, to which is devoted the large gallery on the first floor of the east wing of the building.

Mineralogical
Department.

II. The study of the vegetable kingdom, as far as it can be illustrated by preserved specimens, is the province of the Department of Botany, which occupies the upper floor of the east wing.

Botanical
Department.

III. In the same way the animal kingdom belongs to the department of Zoology, to which is assigned the whole of the western wing of the building.

Zoological
Department.

It will thus be seen that a department of the Museum corresponds with each of the great divisions of natural objects; there is, however, a fourth department, which owes its separate

**Geological
Department.**

existence to a period of scientific culture in which the terms Zoology and Botany were limited to the study of the existing forms of animal and plant life, and the extinct or fossil forms were associated with the minerals, rather than with their living representatives. This arrangement prevailed in the British Museum until the year 1857. The fossils were then severed from this incongruous connection, and placed in a separate department for which the name of "Geology" was reserved.* The result is that there are now two distinct zoological and botanical collections in the building, one containing the remains of all the animals and plants which have lived through successive ages of the world's history from the earliest dawn of life down to close upon the present time, and the other containing only those living at the particular period in which we dwell. Notwithstanding the objections which may be urged against this primary division of living things, it is one which prevails largely in museums, and which, owing to certain conveniences, as well as to the difficulty and expense of re-arranging extensive collections and reorganising the staff in charge of them, will probably be retained for some time to come.

**Introductory
Collection.**

Besides the four above-mentioned departments, into which the collection is divided for the purposes of custody and administration, each of which is under the charge of an officer called "keeper" and a special staff of assistants, there is a fifth, at present under the immediate supervision of the Director, and arranged in the Central Hall, which is intended to be an introduction to all the others. The formation of this has only recently commenced, and owing to the difficulty of procuring the most illustrative specimens when required, and the time needed for their preparation and arrangement, some years must elapse before it can be completed.

**The specimens
all arranged in
three series.**

When the last-named collection is more fully developed, the whole of the specimens contained in the Museum, whether Animal, Vegetable or Mineral, will be arranged in three distinct series, each having its definite end and purpose.

* Palæontology, or the study of ancient living beings, would have been a more appropriate designation, as Geology, the science which investigates the history of the earth, and the changes which its surface has undergone in attaining its present condition, has a much wider scope.

I. An Elementary or Introductory Series, by which the study of every group should commence, in which the leading features of the structure, and, as far as may be, the development of the various parts of some of its most typical members, are demonstrated in a clear and simple manner, and the terms used in describing and defining them explained by means of illustrative examples. This has been already carried out in the Department of Mineralogy, in a series of cases placed on the north or left-hand side of the gallery containing the rest of the collection. The introductory series to the zoological and botanical collections has just been referred to as under arrangement in the Central Hall.

**Introductory
or Elementary
Series.**

II. The Exhibited Systematic Series, in which the most important types of animal, plant, or mineral forms are shown, by means of carefully-selected and well-preserved specimens, arranged in a systematic manner, or one which exhibits, as far as may be, their natural relations to each other. Classification is an important feature in this series, which should be so complete and so arranged as to ensure that every visitor to the Museum can find, without recourse to assistance from the officials, every well-known and very distinct form of animal, plant or mineral, and satisfy himself about, at least, its external characters. In carrying out this ideal, great modifications must be made in practice, partly depending upon the readiness, or the reverse, with which the members of different groups lend themselves for exhibition, partly upon the exigencies of space, and partly upon special circumstances which render the exhibition of the leading forms of some groups of more interest than those of another.

**Exhibited
Systematic
Series.**

While the two series above mentioned have for their object the *diffusion* of scientific knowledge, the next ministers mainly to its *advancement*, and thus between them the twofold object of a National Museum of Natural History is carried out.

III. The Reserve or Study Systematic Series contains all those exceedingly numerous specimens (in many groups, the great bulk of the collection) showing the minute distinctions which are required for working out the problems of variation according to age, sex, season and locality, for fixing the limits of geographical distribution, or determining the range in geo-

**Reserve or
Study
Systematic
Series.**

logical time: distinctions which, in most cases, can only be appreciated when the specimens exhibiting them are kept under such conditions as to admit of ready and close examination and comparison. It is to this part of the collection that zoologists and botanists resort to compare and name the animals and plants collected in expeditions sent to explore unknown lands, to work out biological problems of the highest scientific importance, and generally to advance the knowledge of the science. In fact these reserve collections, occupying comparatively little room, kept up at comparatively little cost, and visited by comparatively few persons, constitute, from a scientific point of view, the most important part of the Museum, for by their means new knowledge is obtained, which, given forth to the world in the form of memoirs, books, or lectures, is ultimately diffused over a far wider area than that influenced even by the exhibited portions of the Museum. Indeed, without the means of study they afford, the order, arrangement, and power of imparting knowledge, which the exhibition galleries possess, would not be possible.

It is important to bear in mind that if the whole of such specimens as are really required for enlarging the boundaries of knowledge were displayed in the public galleries, so that each one could be distinctly seen, a museum very many times larger than the present one would not suffice to contain them; the specimens themselves would be quite inaccessible to the examination of all those capable of deriving instruction from them, and owing to the disastrous effects of exposure to light upon the greater number of preserved natural objects, would ultimately lose almost everything that now gives them value. This portion of the collection must, in fact, be treated as are the books in a library, and only used for consultation and reference by duly accredited students.*

In some parts of the Museum the reserve collections are contained in drawers beneath the cases in which the corresponding exhibited portion is placed. This applies principally to the palæontological specimens, the shells, and the minerals. The reserve birds and insects have special rooms devoted to them,

* For conditions as to admission and regulation, see p. 77.

and the extensive series of reptiles, fishes, and other animals preserved in spirit, are kept for the purposes of safety in a separate building behind the Museum. In the Botanical Department the reserve collections are kept as usual in the well-known form of an Herbarium or *Hortus siccus*.

The great bulk of the specimens being arranged in these three series, there might still be supplementary collections for facilitating the study of the distribution of animals and plants, and perhaps also of minerals, in space and in time. The first, constituting a geographical series, might show by illustrative examples the leading characteristics of the fauna and flora of each great region of the earth's surface; the second, or geological series, would give examples of the fossil remains found most abundantly in each formation, arranged as far as may be in chronological order.

The only attempt hitherto made at exhibiting a geographical series in the Museum is the special collection of animals of the British Isles, arranged in a room on the ground floor behind the great staircase of the Central Hall. It would be impossible in the present building to find room for any further geographical collections, however interesting and instructive they might be. With regard to geological collections, although the specimens in the department so called are mainly arranged not geologically, or according to stratigraphical position, but according to their natural affinities, yet, in many cases, it has been found convenient to adopt a mixed arrangement, the specimens within each large natural group being classified according to the sequence in age of the strata in which they were found. Such an arrangement however is only applicable to the fossils of a particular region, owing to the great difficulties in accurately determining the correspondence in age of formations occurring in distant parts of the earth's surface; hence a large and varied palæontological collection, such as that of the British Museum, must be arranged in the main upon a systematic or zoological and botanical basis. A limited but instructive series, showing the most characteristic rock formations with their included fossil remains, of the British Isles, placed in chronological sequence, is arranged in one of the galleries of the Geological Department.

Supplement-
ary Collec-
tions.

Geographical.

Geological.

TOPOGRAPHICAL DESCRIPTION OF THE MUSEUM AND ITS CONTENTS.

In following this short account of the contents of the various sections of the building, the visitor must bear in mind that the principal front faces the south, and that therefore on entering the great hall he will be looking due north, with the east on his right, and the west on his left hand.

It must also not be forgotten that a museum in a state of active growth is continually receiving additions as well as undergoing changes in the arrangement of its contents, and as these often occur faster than new editions of the guide can be produced, there may be variations in the position of some of the specimens from the descriptions here given.

THE CENTRAL HALL.

Central Hall. The cases placed on the floor of the hall illustrate general laws or points of interest in Natural History which do not come appropriately within the systematic collections of the departmental series.

Group of Pigeons illustrating Variation under Domestication. One group, in a case near the entrance to the hall, on the right, shows the great variation to which a species may become subject under the influence of domestication, as illustrated by choice examples of the best marked breeds of Pigeons, all of which have been derived by careful selection from the wild Rock Dove (*Columba livia*), specimens of which are shown at the top of the case.

Groups of Fowls and Canaries illustrating Variation under Domestication. In the corresponding case on the left are further illustrations of the same subject. A pair of the Common Jungle Fowl of India shows what is generally considered to be the original form from which all our various breeds of domestic fowls are derived. As examples of two of the most extreme modifications in opposite directions which have yet been produced by artificial selection, are the Japanese long-tailed fowls, in which

some of the feathers (coverts) have attained a length of nine feet, and specimens of another race kept in many parts of Europe in which the tail is entirely absent. There is also shown a group of fowls which now live in a wild state in the woods of the Fiji Islands, but are descendants from domestic fowls introduced by the early voyagers of the last century.

Some Canary Birds are also shown in this case as one of the most recent additions to our stock of domesticated animals, having been first imported into Europe from the Canary Islands in the early part of the sixteenth century. Specimens are exhibited of the wild birds, and of some of the most striking modifications which have been produced by careful cultivation through many generations.

A case placed on the left of this illustrates a remarkable instance of external variation in the two sexes and at different seasons, not under the influence of domestication. The birds in it all belong to one species, the Ruff (*Machetes pugnax*), of which the female is called Reeve, belonging to the Snipe family (*Scolopacidæ*). In the upper division of the case are shown the eggs, newly-hatched young, young males and females in the first autumn plumage, and old males and females in winter, when both sexes are exactly alike in colour, size only distinguishing them. The large group occupying the lower part of the case consists of adult birds in the plumage they assume in the breeding time (May and June). In the female the only alteration from the winter state is a darker and richer coloration, but in the males there is a special growth of elongated feathers about the head and neck, constituting the "ruff," from which the bird derives its name. In addition to this peculiarity, another may be observed, which is rare among animals in a wild state (though so common among domesticated races), that of striking diversity of colour in different individuals. As many as twenty-three specimens are shown in the case, no two being entirely alike.

Group of Ruffs and Reeves, illustrating external variation according to sex and season.

On the same side of the hall follow two cases which illustrate the adaptation of the colour of animals to their natural surroundings, by means of which they are rendered less conspicuous to their enemies or their prey. The first contains a specimen of a mountain or variable Hare (the common species of the North of Europe), a Stoat, and a Weasel, some Willow

Cases illustrating Adaptation of Colour to surrounding Conditions.

Grouse and Ptarmigan in their summer dress, obtained in the neighbourhood of Christiania in the month of July, showing the general harmony of their coloration at this season to that of the rocks and plants among which they live. The second case shows the same species of animals obtained from the same spot in mid-winter, when the ground was completely covered with snow. Such complete changes as those here shown only occur in latitudes and localities where the differences between the general external conditions in the different seasons are extreme, where the snow completely disappears in summer and remains continuously on the ground during the greater part of the winter. Even some of the species here shown do not habitually turn white in the less severe winters of their southern range, as the Stoat in England and the Hare in Ireland. In a few permanent inhabitants of still more northern regions, where the snow remains throughout the year, as the Polar Bear, Greenland Falcon, and Snowy Owl (of which a specimen is shown on the wing in the upper part of the winter case), the white colour is retained throughout the year. The whiteness of these animals must not be confounded with *albinism* (whiteness occurring accidentally in individuals normally of a different colour), illustrated in a case on the other side of the hall.

Case illustrating Protective Resemblances and Mimicry.

The case nearest the great staircase contains further examples of a subject attracting much attention among naturalists at the present time—Protective Resemblances and Mimicry. The simplest form, that of conformity of general style of colouring to surrounding conditions, is seen in the group at the bottom of the case, consisting of some of the commoner birds, mammals, and reptiles of the Egyptian desert, placed upon the stones and sand amid which they habitually live. The advantage of this colouring in concealing the herbivorous species from their enemies, and enabling the carnivorous to approach their prey unperceived, is obvious. Many excellent cases of concealment by adaptation to environment, especially in eggs and young birds, may be seen among the groups in the bird gallery.

More special modifications for the same purpose are shown in the examples in the upper part of the case, of insects which closely resemble the inanimate objects, as leaves, twigs, &c., among which they dwell. The close imitation of a dead leaf, presented by

the butterfly (*Kallima inachis*), when its wings are closed, could not be surpassed. A further stage of the same condition, called "Mimicry," is where the object resembled, or mimicked, is another living animal, belonging to a different species, family, or even order. The resemblance in these cases is also believed to be for protection, or to be in some way advantageous to the animal possessing it. We know, however, so little of the habits and life-history of animals in a state of nature that many of the purposes supposed to be served by particular colours or appearances can only be regarded at present as conjectural. Whatever be the real explanation, the facts shown by the specimens in this case are very curious, and well worthy of careful consideration.

The next case contains a series of specimens illustrating *albinism*, a condition in which the pigment or colouring matter, usually present in the tissues constituting the external covering of the body, and which gives them their characteristic hue, is absent. Individuals in this condition occur among many animals of various kinds, and are called "*albinos*." In some of the specimens shown in the case the albinism is complete, but in many it is partial, the absence of colouring matter being limited to portions of the surface only.

Group illustrating
Albinism.

An eighth case shows examples of the opposite condition, called *melanism*, depending upon an excess of dark-coloured pigment in the skin and its appendages, the hair, feathers, etc., beyond what is normally met with in the species. This is by no means so frequent as albinism. A black Leopard in the middle of the case is a good illustration. It is not a distinct species, but an individual variety of the common Leopard, born from parents of the normal colour. A black Bullfinch is introduced as an example of acquired melanism, the bird having turned black in captivity.

Group illustrating
Melanism.

The last group shows that two forms of Crows which appear quite distinct, and which, judged by their external characters, might be held to be different species, may in a state of nature unite, and produce offspring of a perfectly intermediate character. In the same case is also a series of Goldfinches, showing a complete gradation between birds of different coloration, and which have naturally been held to be different species. Both

Group illustrating
**Intermediate
Forms in
Nature.**

these examples may by some naturalists be considered instances, not of crossing of distinct species, but of "dimorphism," or the occurrence of a single species in nature under two different outward garbs; but from whatever point of view they are regarded, they illustrate the difficulty, continually increasing as knowledge increases, of defining and limiting the meaning of the term "species," of such constant use in biology.

**Bays or
Alcoves round
the Hall.**

The bays or alcoves round the hall, five on each side, are devoted to the Introductory or Elementary Morphological Collection, designed to teach the most important points in the structure of the principal types of animal and plant life, and the terms used in describing them, all which should be known before the systematic portion of the collection can be studied with advantage. This has been called the "Index Museum," as it was thought at one time that it would form a sort of epitome or index of the main collections in the galleries; but the name does not exactly express what it has developed into. It is really more like the general introduction, which almost always precedes the systematic portion of treatises on any branch of natural history. As mentioned before (p. 18), this collection is at present far from complete; and as nothing exactly like it has been exhibited in any public museum before, it will, as its formation goes on, be subject to much modification and improvement; but it is hoped that it may ultimately serve as a guide for the formation of educational biological museums elsewhere. The space being strictly limited, the number of illustrative specimens is necessarily restricted, probably to the advantage of the student, at all events in the earlier part of his career. In examining this collection the visitor should follow each case in the usual order of reading a book, from left to right, and should carefully study all the printed explanatory labels, to which the specimens are intended to serve as illustrations.

The bays on the west side (left-hand on entering the hall) are devoted to the Vertebrated Animals, or those possessing a "backbone." In Nos. I. and II. are shown the characters of the Mammalian modifications of this type. The wall-cases of No. I. are already nearly filled with specimens showing the bony framework (internal skeleton) of Mammals.

In the first case (south side of the recess) will be seen a complete skeleton of a good example of the class—a large monkey, with all the bones separated, laid out on a tablet, and with their names affixed to them. Below it is a skeleton of the same animal articulated, or with the bones in their natural relation to each other, and also named. By examining these two specimens a fair idea may be obtained of the general framework of the body of animals of this class. In other parts of the case are placed examples of modifications of the skeleton to suit different conditions of life.

Bay I.
Skeleton of
Mammals.

1. Man, showing a skeleton adapted for the upright position.
2. A Bat, or flying mammal, in which the fore-limbs are converted into wings by the great elongation of the fingers, which support a web of skin stretched between them.
3. A Sloth, in which the ends of all the limbs are reduced to mere hooks, by which the creature hangs back-downwards from the boughs of the trees among which it passes its entire existence.
4. The Baboon serves as an example of an animal walking on all four limbs in the "plantigrade" position, *i.e.*, with the whole of the palms of the hands and soles of the feet applied to the ground.

5. A small species of Antelope shows the characteristic form of a running animal, in which the limbs perform no office but that of supporting the body on the ground. It stands on the tips of the toes of its elongated slender feet.

6. A Porpoise, adapted solely for swimming in the water. The fore limbs are converted into flattened paddles, and the hind limbs are entirely absent, their function being performed by the tail. The rudimentary pelvic bones are preserved.

The rest of the case is occupied by details of the skull in some of its principal modifications. At the top are diagrams of the structure of bone and cartilage as shown by the microscope.

In the wall-case on the opposite (north) side of the bay the outline of the osteology of mammals is continued by illustrations of the structure of the limbs. At the top of the case is a diagram showing the correspondence of the hand and the foot in its complete typical form, with the names applied by anatomists to the different bones. The series of specimens below show the principal deviations which actually occur from

the typical condition, which, as will be seen, is very nearly preserved in the human hand. One interesting series shows some of the stages of modification for special purpose (specialization) by which a typical five-fingered hand becomes converted into that of the single-fingered Horse, and another series ends with the hand of the ruminants, with only two fingers remaining, sometimes, but erroneously, called a "cloven hoof." Similar changes are shown in the toes of the hinder extremity, illustrating the same common plan running through infinite modifications in detail, enabling the organ to perform such a variety of purposes, and to exhibit such diversity of outward appearance. The existence of this common plan is now generally thought to be due to inheritance from a common ancestor.

**Skeletons of
Man and
Horse.**

In a large case at the back of the bay are the skeletons of a man and of a horse, arranged for comparison with each other, and also to show the position of the bones of both in relation to the external surface. In the case of the horse, the skin of the same animal from which the skeleton was prepared was carefully mounted, and, when dry, divided in the middle line, and one half, lined with black velvet, placed behind the skeleton. In the man the external surface is shown by a *papier-maché* model, similarly lined and placed in a corresponding position. As all the principal bones of both skeletons have their names attached to them, a careful study of this group affords not only an instructive lesson in comparative anatomy, but will also, it is hoped, be of practical utility to the artist.

**Teeth of
Mammals.**

The central case of the bay contains a collection illustrating the principal characters of the teeth in the Mammalia. Its inspection should commence at the north-east corner, where the visitor will find himself after completing the survey of the osteological specimens in the wall-cases. In the first division specimens are placed showing the general characters of teeth, their form, the different tissues of which they are composed, the two great types of dentition in mammals, *homodont* and *heterodont*, the nomenclature and homologies of the different teeth, and their development and succession. The principal modifications of teeth according to their function are next shown by examples of forms adapted for fish-eating, flesh-eating, insect-eating, grass-eating, &c. The remainder of the

case is taken up by select examples of the dentition of all the different families of mammals arranged in systematic order, prepared so as to display not only the shape of the crowns, but also the number and character of the roots by which they are implanted.

Bay No. II. The two wall-cases contain a collection arranged so as to show in a synoptical manner the generally recognised orders and sub-orders of existing Mammals, by examples specially selected to illustrate the predominating characters by which they are distinguished. A brief popular account of the characteristics of the group, and a map showing its geographical distribution, is placed with each. This is intended not only for an introduction to the study of the class by visitors to the museum, but also as a guide to a method of arrangement which may be advantageously adopted in other institutions of comparatively limited resources.

Bay II.
Classification
of Mammals.

Among the illustrations of the order *Primates* is placed the skeleton of the young Chimpanzee, dissected by Dr. Tyson, and which formed the subject of his remarkable work on the "Anatomy of a Pigmie," published in 1699, the earliest scientific description of any man-like ape.

The central case of this bay contains illustrations of the outer covering or integument and its modifications in the class of Mammals, divided into the following sections:

Integument
of Mammals.

1. Expansion of skin to aid in locomotion, as the webs between the fingers of swimming and flying animals, the parachutes of flying animals.

2. The development of true bony plates in the skin, found among mammals only in the Armadillos and their allies. The cast of a section of the tail of a great extinct species (*Glyptodon*) shows well a bony external as well as internal skeleton.

3. The outer covering modified into true scales, much resembling in structure the nails of the human hand. This occurs in only one family of mammals, the Pangolins or *Manidæ*.

4. Hair in various forms, including bristles and spines. The two kinds of hair composing the external clothing of most mammals, the long, stiffer outer hair, and the short, soft under fur, are shown by various examples.

5. The special epidermal appendages found in nearly all mammals on the ends of the fingers and toes, called according to the various forms they assume, nails, claws or hoofs.

6. The nasal horns of the Rhinoceros, shown by sections to consist of a solid mass of hair-like epidermic fibres.

7. The horns of Oxen, Goats and Antelopes, consisting of a hollow conical sheath of horn, covering a permanent projection of the frontal bone (the horn-core).

8. The antlers of Deer, solid, bony, generally branched, projections, covered during growth with soft vascular hairy skin, and shed and renewed annually.

Against the wall at the back of the bay is placed a case containing a series of preparations, showing in a very complete manner the changes in the dentition of the horse at different ages, and above this is arranged a series of antlers of the Common Stag or Red Deer (*Cervus elaphus*), grown and shed in six successive years, showing the changes which took place in their size and form, and the development of the branches or tynes in each year.

The other systems of organs of the class will occupy the remainder of the central case of this bay.

Bay No. III. is devoted to the class of Birds. An Albatross (*Diomedea exulans*) mounted with the wings expanded, shows the most important characters by which a bird is externally distinguished from other animals. The surface of the body is clothed with feathers, which (in the majority of birds), by their great size and special arrangement upon the fore-limbs, enable these to act as organs of flight. The mouth is in the form of a horny beak. A nestling Albatross shows that at this stage of its existence the bird is not clothed with true feathers, but only with soft down, which serves to keep the body warm, but confers no power of flight. An Emu and Apteryx in the lower compartment of the case show the exceptional condition, found only in a comparatively few members of the class, of birds with wings so small as to be concealed beneath the general feathery covering of the body, and quite functionless. In the Penguin, the wings are reduced to the condition of fins, and are only serviceable for progression through the water.

In the first wall-case the principal facts in the osteology of the

class are shown. Sections of bones exhibit the large air cavities within; a complete skeleton of an Eagle, with the bones separated and named, and mounted skeletons of the Ostrich, Penguin, Pelican, Vulture, Fowl, &c., show the chief modifications of the skeleton. The Apteryx shows the smallest, and the Frigate bird the largest bones of the wing, the correspondence of which can be readily traced by means of the labels attached to them. The under surfaces of the skulls of various birds are shown with the different bones coloured to indicate their limits and relations, followed by a series of the different types of sternum or breast-bone.

The second wall-case contains further illustrations of the anatomy of birds, including a series arranged to show the general characters of the eggs of this class, as exemplified in their structure, number, form, size, texture of surface and colour.

The table-case in the middle of the bay contains illustrations of the external characters, the beak, the feathers and the tail, as well as of the fore and hind limbs, or wings and feet. By the aid of the explanatory labels, the essential characters and the principal modifications of all these parts can easily be followed out by any one wishing to become acquainted with them.

Bays IV. and V., completing the west side of the hall, will, in a similar manner, show the most important points in the structure of reptiles, amphibia and fishes. In the latter is a very fine skeleton of the Great Blue Shark (*Carcharodon rondelii*) from New Zealand, with the names of all the parts affixed to them.

Contents of
remaining
Bays not
completed.

Of the bays on the east side of the hall, No. VI. is for the illustrations of the articulated classes, Crustacea, Arachnida, Myriopoda and Insecta, as well as of the Annulosa and Vermes. The table case contains an extensive series of preparations showing the structure of insects. No. VII. is for the Mollusca, Echinodermata, Cœlenterata, Porifera and Protozoa. In this bay the arrangement of the series illustrating the general characters of the shells of Mollusca is nearly complete. The south side of the case in the middle of this bay contains a very full exposition of the characters and structure of the various kinds of Porifera or Sponges. The remaining three, VIII., IX.,

and X., are for the morphology of the vegetable kingdom: the first containing the Cryptogams, the next the Gymnosperms and the Monocotyledons, and the last the Dicotyledons. By this arrangement the lowest or simplest forms of animal or plant life, those on the borderland, as it were, of the two kingdoms, will be brought into contact, and at the two ends of the series, in Bays I. and X., will be found the groups which show in the highest degree the special attributes of the division to which they belong.

Cryptogams.
Bay VIII.

In Bay VIII. are illustrations of the general characters of the Cryptogams, one of the two great sub-kingdoms of the plant world, and distinguished from the Phanerogams—the flowering or seed-plants—by the absence of a seed. Except in some of the lowest forms sexual reproduction occurs, but the oospore, the result of the union of the male and female cells, does not develop into an embryo and remain enclosed within a seed-coat formed from the tissue of the mother plant.

In the first group of Cryptogams which occupies the wall-case on the left, the plant shows no distinction into root, stem, and leaf, but consists of a more or less uniform structure called a *Thallus*; hence the name Thallophytes. The lowest forms, or *Protophytes*, are unicellular organisms, and can only be represented in such a collection by considerably magnified drawings. Here, as in all the Thallophytes, we distinguish two divisions, one of green or chlorophyll-containing plants like *Protococcus*, which lead an independent existence, and another of colourless plants like *Bacteria*, which, having no chlorophyll, are doomed to a parasitic mode of life.

The rest of the case is devoted to the Algæ, Fungi, and Lichens. The Algæ contain chlorophyll, the green colour of which is sometimes obscured by a red or brown colouring matter, and include the sea-weeds as well as many fresh-water plants. The fungi have no chlorophyll, but live as parasites on living organisms, *e.g.*, *Rhytisma acerinum*, which forms black spots on maple leaves, or as saprophytes on dead or decaying organic matter, *e.g.*, *Penicillium*. The Lichens are composite organisms, consisting of a fungal and an algal element, which live together.

The second group, or Bryophytes, include Mosses and

Liverworts. Except in the lower forms of these, a main axis, or stem and leaves borne upon it, can be distinguished.

In the third group, or Pteridophytes, including Ferns and their allies, which occupy the right-hand wall-case, the plant body shows a marked distinction into a stem or ascending axis bearing leaves, and a root or descending axis. They are also called Vascular Cryptogams, as they contain systems of vessels forming bundles of wood and bast, not found in the two other groups, which are therefore known as Cellular Cryptogams.

In the middle of this bay is placed a section of a very large Wellingtonia or "Big Tree" (*Sequoia gigantea*), which was cut down in 1892 near Fresno, in California. It is about fifteen feet in diameter, and perfectly sound to the centre, showing distinctly 1,335 rings of annual growth, which afford exact evidence of the age of the tree. An instantaneous photograph, taken while the tree was being felled, is placed near it, and shows its general appearance when living. It height was 276 feet.

Section of
large Sequoia.

The last two bays are devoted to the great group of Phanerogams or seed-plants, where, besides the distinction of stem, leaf, and root, and the development of vascular tissue, we find a structure unknown in the Cryptogams, viz., the seed, where the embryo, or commencement of a new individual, is developed within and protected by one or more envelopes (seed-coats), consisting of tissues of the mother plant.

The left-hand portion of Bay IX. contains specimens of the smaller division of seed-plants, the Gymnosperms, in which the pollen falls directly on the naked ovule. In the wall-case the upper row of specimens illustrates the form of the leaf, while the lower deals with the stem and root. The internal structure of these is demonstrated by means of large sections. Important details in structure form the subject of the drawings in the upper part of the case. In the left-hand side of the central case are specimens of the flower and fruit. The Cycads are of special interest, demonstrating the leaf nature of the carpel or ovule-bearing organ.

Gymnosperms
and Mono-
cotyledons.
Bay IX.

Passing to the right-hand portion of the bay, we come to the angiospermous division of seed-plants, in which the pollen penetrates the stigma and fertilises the ovule in a closed chamber or ovary, which develops into the fruit enclosing the

seed. Here we find the smaller class of Angiosperms, known as Monocotyledons, and characterised by a single seed-leaf or cotyledon, and foliage leaves with more or less parallel veins, without the irregular network found in a dicotyledonous leaf. An upper series in the wall-case illustrates the leaf, while below the characters of the stem and root are shown. Some anatomical drawings are placed in the upper part of the case. The right-hand half of the central case contains specimens of the flower, fruit, and seed; wax models are here frequently employed. Among these will be noticed many grasses and sedges, which, with the palms, aroids, orchids, and liliaceous plants, form the bulk of the Monocotyledons.

At the back of the bay is a fine polished section of a buttress from the base of the Tapang (*Abauria excelsa*), the largest tree in Borneo, attaining a height of 250 feet.

**Bay X.
Dicotyledons.**

The last bay contains the Dicotyledons, characterised by a pair of cotyledons and foliage leaves with an irregularly netted venation. Here also the arrangement of the vegetative parts of the plant is based on its differentiation into root, stem, and leaf. In the two wall-cases the upper series of specimens illustrates the leaf, its form, veining, duration, the characters of its stalk and stipules, its modification for special purposes, and its arrangement on the stem and in the bud. In the lower row the root and stem are similarly treated, and above are some anatomical drawings.

In the central case the chief types of the flower with its parts, the fruit and the seed are exhibited.

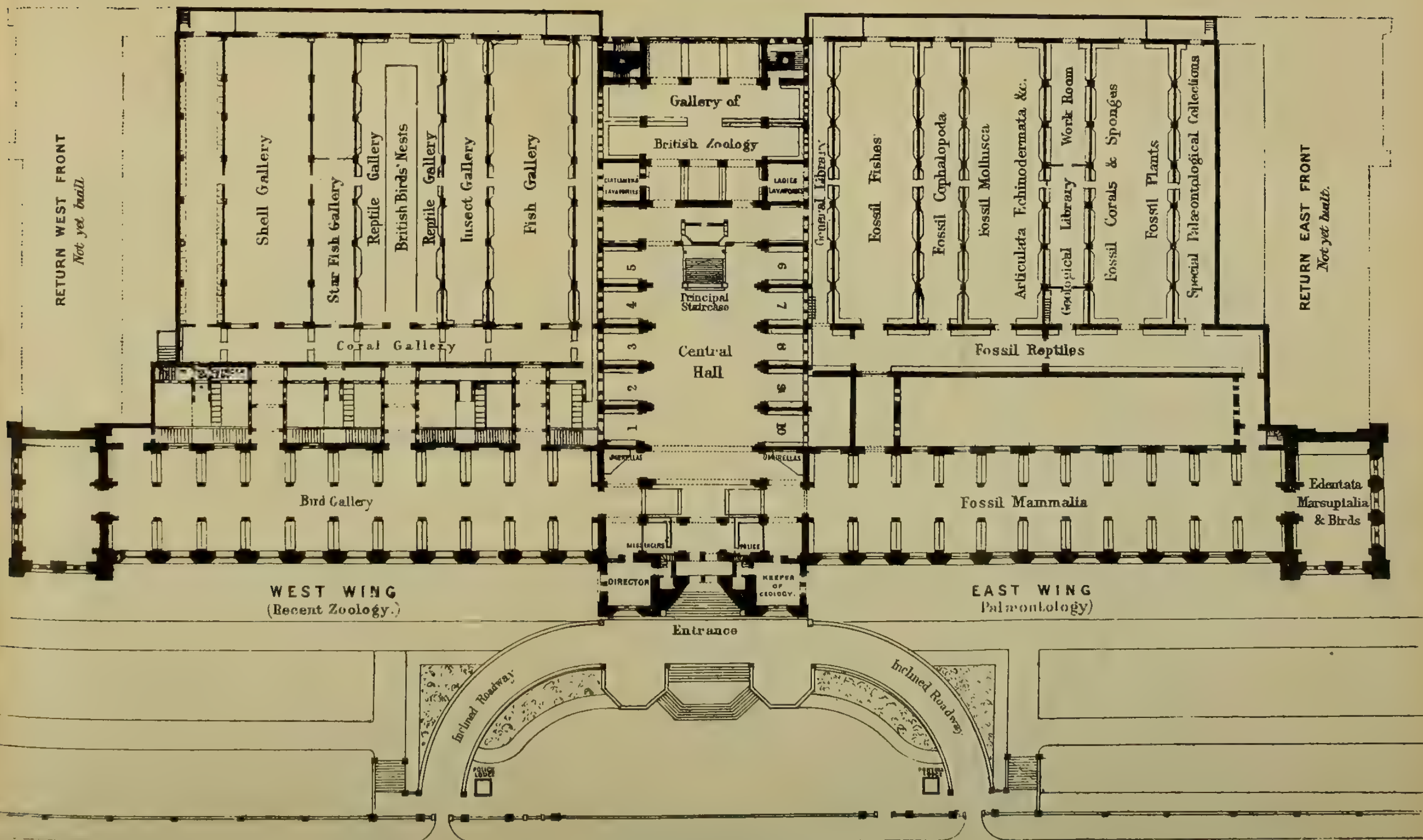
A small space at the end of the bay is assigned to Hairs, Prickles, and similar structures, which are divided into two classes—*Trichomes*, or hairs proper, in which only the outer cell-layer (epidermis) of an organ takes part; and *Emergences*, in which tissues beneath the epidermis are also concerned. At the back of the bay is a large transverse section of the Karri tree (*Eucalyptus diversicolor*) of Western Australia, which grows to a height of 400 feet. The tree, of which this is a section, was about 200 years old when cut down.

The Introductory Collection of Minerals will be found in the gallery devoted to that department of the collection (see p. 54).

BRITISH MUSEUM (NATURAL HISTORY).

Ground Floor.

Scale of  Feet.





GALLERY OF BRITISH ZOOLOGY.

At the north end of the Central Hall, with entrances on either side of the great staircase, is a large room containing a collection of animals of all classes, which are, or have been in recent times, found in the British Isles, either as permanent residents, or as regular migrants or occasional visitors. The animal inhabitants of any country or district are collectively termed its "*fauna*." Our country in this respect belongs to the great zoographical region called Palæarctic, embracing all Europe, the north of Africa, and the western and northern portions of Asia. As in the case of all islands, the species belonging to groups whose powers of locomotion are limited to the land or fresh water, are not numerous compared with those inhabiting large continental tracks. Their numbers can only increase under very exceptional circumstances, but, on the contrary, have a tendency to diminish, as the growth of human population and increase of the area of cultivated land gradually circumscribe their native haunts. In this way, the Brown Bear, the Wolf, the Beaver and the Wild Boar have all disappeared from Britain within the historic period, and others, as the Badger, Marten and Wild-cat, with difficulty maintain a somewhat precarious existence. These have all been originally derived from the mainland of Europe, probably before the formation of the channel which now makes our country an island. The wider and older channel which separates Ireland from Great Britain has proved a greater barrier to the emigration of animal life than that between the latter and the Continent, many species (as the Polecat, Wild-cat, Mole, Squirrel, Dormouse, Harvest-mouse, Water and Land Vole, Common Hare, Roedeer, as well as Snakes and Toads) never having crossed it, unless by aid of human agency.

On the other hand, those species that have the power of travelling through the air or traversing the ocean are far less fixed in their habitat, and thus the list of so-called "British birds" receives accessions from time to time from stragglers which find their way from the European continent or even across

Gallery of
British
Zoology.

the Atlantic, and doubts as to the authenticity of some of the recorded occurrences make the list rather a vague and uncertain one. The constitution of the marine fauna in the same way is continually liable to undergo fluctuations.

Slight but permanent variations from the continental type can be recognised in a few of our indigenous species, the most marked among vertebrated animals being the Irish Stoat (*Putorius hibernicus*), the common Red Grouse (*Lagopus scoticus*), and several species of fresh-water fishes, mostly belonging to the genus *Salmo*. Some of the latter have an extremely local distribution, being only found in some small groups of mountain lakes. Many species, or at all events well-marked varieties, of insects, and a few land and fresh-water molluscs, have at present been only found within the limits of our islands.

The upright cases on the south side of the room, between the two entrances, contain the larger mammals which still inhabit the British Islands, except the Cetacea (Whales and Dolphins), which on account of their size are placed in the gallery appropriated to the general collection of animals of that order (see p. 47). Of the Seals, but two species are really indigenous, the Common Seal (*Phoca vitulina*) and the Great Grey Seal (*Halichærus grypus*); but other species, as the Ringed and the Harp Seal of the Northern Seas, are exhibited in their capacity of occasional but rare visitors to our shores. Of the land Carnivora, specimens are seen of the Wild Cat, the Fox, the Badger, Otter, Marten, Polecat, Weasel, and Stoat or Ermine, which only occasionally (as in a beautiful example shown) assumes the white colour in England, though this change is the rule in countries with severer winter climates. The Rodents are represented by the Common and the Variable or Mountain Hare, which turns white in winter in the Highlands of Scotland, and by the Rabbit. Of the Ruminants, a specimen of the wild White Bull of Chillingham Park, Northumberland, stands between the cases, and there are stuffed specimens and antlers (above the cases) of the Red, Roe, and Fallow Deer; the latter, however, an introduced species, now naturalised in our parks.

The smaller mammals are exhibited in two square cases standing out in the body of the room, that on the left containing the Rodents (Squirrel, Dormouse, Voles, Mice, and Rats), and

that on the right, the Insectivora (Hedgehog, Mole and Shrews) and the Bats.

Nearer the middle of the room is a larger case, divided into an upper and a lower compartment, the former containing the Amphibia (Frogs, Toads, and Newts) in spirit, the latter the few species of Reptiles (Snakes and Lizards) found in our islands. The distinctive characters of the three snakes, the Common or Ringed Snake (*Tropidonatus natrix*), and the Smooth Snake (*Coronella austriaca*), both harmless, and the venomous Viper (*Vipera berus*), can be made out from the specimens, although the vividness of their natural colours is very difficult to preserve when long exposed to the light.

The far more numerous birds and fishes occupy the two sides of the series of upright cases, which fill the west and east ends of the room, and project on each side so as to make a partial division across it. Among the birds will be seen a specimen of the extinct Great Auk (*Alca impennis*), of which the Museum possesses a second example in the Bird Gallery (p. 40). The largest specimens of fishes are placed on stands out of the cases, near the middle of the room being a Greenland Shark (*Læmargus borealis*), fifteen feet long, which was captured near Anstruther, on the east coast of Scotland, May 18th, 1878. Next to this in size are the Porbeagle (*Lamna cornubica*) and the Fox Shark or Thresher (*Alopias vulpes*).

The cases occupying the northern section of the room (near the windows) are devoted to the Invertebrata. The wall-case on the west (left) side contains the larger specimens of Mollusca, Tunicata, Annelida, Echinodermata, and Cœlentrate in spirit, including some remarkably fine specimens of an Alcyonarian called *Funiculina quadrangularis*, one of which has a long-armed star-fish (*Astronyx loveni*) twined around it. These were dredged up in the Firth of Lorn, west coast of Scotland. The wall-case on the east (right) side contains a series of nests of hornets, wasps, bees, ants, &c. In the intermediate table-cases are arranged the collection of dried specimens of British Mollusca, Insects, Crustaceans, Polyzoa, Sponges, &c. The cases beneath the windows of the north wall are entirely devoted to the exhibition of British Echinoderms, star-fishes, sea-urchins, &c. Forms of which the characters are difficult to preserve are

shown by drawings from the living animals placed on the walls.

**British
Butterflies
and Moths.**

Two cabinets placed against pillars facing the centre of the room are devoted to a special collection of British Butterflies and Moths (*Lepidoptera*) with their larvæ, which were all prepared by Lord Walsingham, and presented to the Museum by him in 1887. The caterpillars are mounted on models of the plants upon which they feed, and are remarkable for the life-like appearance they present.

Egg Cabinets.

Opposite to these are two cabinets containing a nearly complete series of British Birds' eggs. In these will be seen specimens illustrating the principal variations in the eggs of both resident species and occasional visitors. Especial attention is directed to the series of Cuckoos' eggs, with the accompanying clutches of the eggs of the foster-parents.

STAIRCASE.

**Statue of
Darwin.**

On the first landing of the great staircase, facing the centre of the hall, is placed the seated marble statue of CHARLES DARWIN (b. 1809, d. 1882), to whose labours the study of natural history owes so vast an impulse. The statue was executed by Sir J. E. Boehm, R.A., as part of the "Darwin Memorial" raised by public subscription. It was unveiled and placed under the care of the Trustees of the Museum on the 9th of June, 1885, when an address was delivered on behalf of the Memorial Committee, by the Chairman, Professor Huxley, P.R.S., to which His Royal Highness the Prince of Wales, as representing the Trustees, replied.

**Statue of
Banks.**

Above the first landing the staircase divides into two flights, each leading to one of the corridors which flank the west and east sides of the hall, and by which access is gained to the galleries of the first floor of the building. At the southern end of these corridors a staircase from each, raised on an arch which spans the hall, join to form a central flight leading to the second or uppermost floor. On the landing at the top of this flight is placed a marble statue by Chantrey of SIR JOSEPH BANKS (b. 1743, d. 1820), the munificent patron of science and scientific men, who for forty-one years presided over the Royal Society, and was an active Trustee of the Museum. His splendid botanical

collections are preserved in the adjoining gallery, but his unrivalled library of works on natural history, also bequeathed to the Museum, remains in the old building at Bloomsbury, in the entrance hall of which the statue, erected by public subscription in 1826, stood, until it was removed to its present situation by direction of the Trustees in the year 1886.

The west corridor contains a portion of the collection of **African Antelopes**. mounted mammals for which there is not room in the gallery immediately adjoining. The specimens placed here are selected examples of the finest African antelopes, animals remarkable for their beauty, for their former countless numbers, and for their threatened extinction in consequence of the inroads of civilized man into their domain.

In the east corridor is placed at present the collection of **Gould Collection of Humming-Birds**. Humming-birds (*Trochilidæ*) arranged and mounted by the late Mr. John Gould, and purchased for the Museum after his death in 1881. The resplendent colours and singular varieties of form presented by these fairy-like objects must always excite feelings of admiration and wonder in all who gaze upon them.

WEST WING.

The whole of the west wing of the building is devoted to the collections of recent Zoology.

(A) GROUND FLOOR.

The ground floor is entered from the west side (left hand) of **Bird Gallery**. the Central Hall, near the main entrance of the building. The long gallery extending the entire length of the front of the wing is assigned to the exhibited collection of birds, the study series of the same group being kept in cabinets in a room behind.

The wall-cases contain mounted specimens of all the principal species placed in systematic order, beginning with the Vultures, on the left hand on entering, and ending with the Penguins on the right. A complete rearrangement of this series has been commenced. Certain groups, as the Humming Birds (*Trochilidæ*) and the Woodpeckers (*Picidæ*), both on the left side of the gallery, have been remodelled, and the rest will follow on the same lines in due course.

From the multitude of specimens which are exhibited in this gallery, and which form but a small proportion of the different kinds of birds known to inhabit the globe, only a few of the most striking can be mentioned here. The various types of the birds of prey are very fully represented: from the Condor or Great Vulture of the Andes, the large Sea-eagle of Behring Straits, and the Great Eagle Owl of Europe, all of which are placed in separate cases, to the Dwarf Falcon in case 13, which is not much larger than a sparrow, and preys upon insects. Among the large group of perching birds, attention is drawn to the case of birds of Paradise opposite to wall-cases 18 and 19. At the end of the same side of the gallery are placed skeletons of the Dodo and Solitaire, gigantic pigeons with wings too small for flight, once inhabitants of the islands of Mauritius and Rodriguez, but now extinct. The cases on the right-hand side of the gallery are occupied by birds allied to the common Fowl, and by the wading and swimming birds; among them is a fine series of Pheasants and other game birds, the Great Bustard, once an inhabitant of our island, a pair of Flamingoes with their nest, the Great Auk from the Northern Seas, now extinct, and finally the large Emperor Penguin from the Antarctic Ocean, the only known specimens of which were obtained during the British Antarctic expedition of 1839-43.

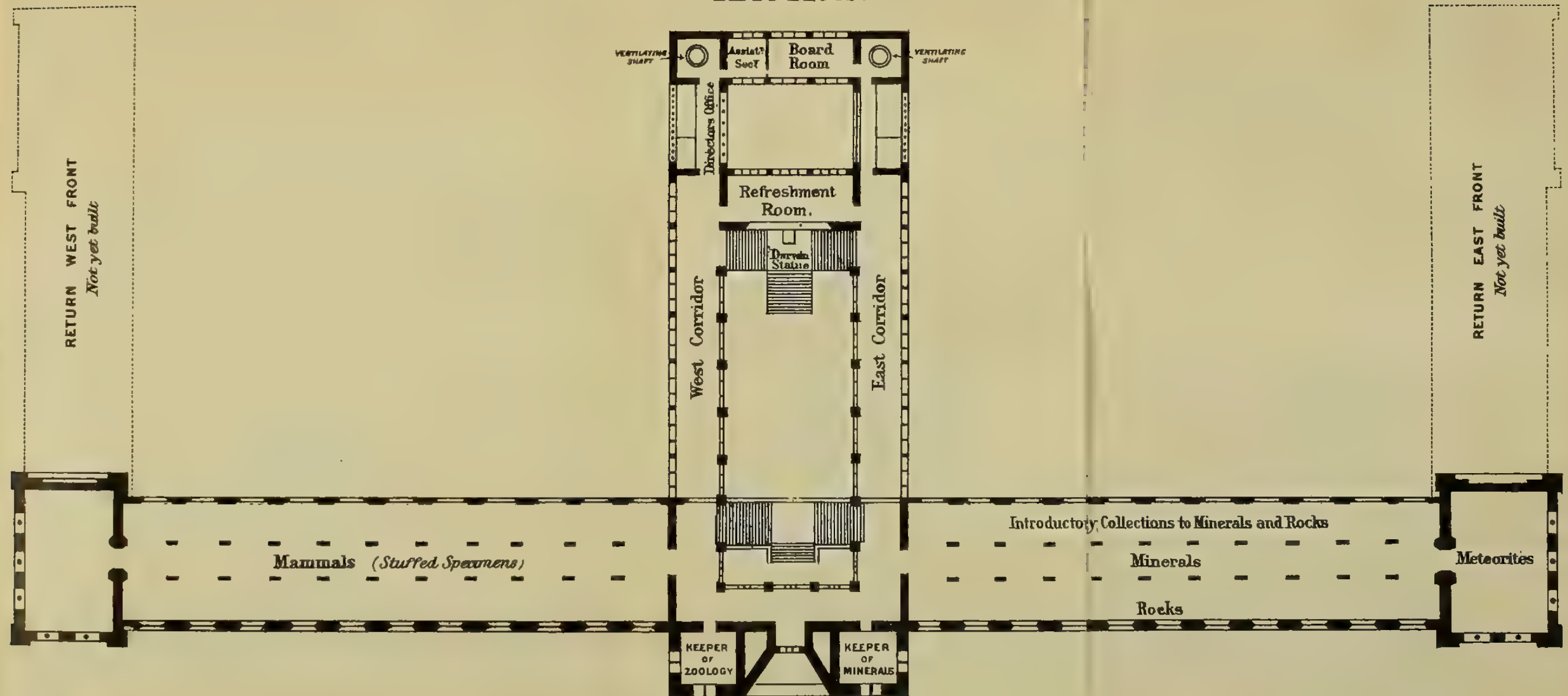
In the "Pavilion," or room at the further end of the gallery, are placed the specimens of the peculiar division of birds called *Ratitæ*, from the flat or raft-like character of the breast-bone, and which, owing to the rudimentary character of their wings, have not the power of raising themselves off the ground in flight. They include the largest existing birds, the Ostriches, Emus and Cassowaries, as well as the small Kiwi or Apteryx of New Zealand.

**Groups of
British Birds
and Nests.**

In the middle of the gallery and in the spaces between the wall-cases are placed various isolated groups of particular interest, among which the visitor will doubtless be attracted by those showing the nesting habits of our best-known British birds. The great value of these groups consists in their absolute truthfulness. The surroundings are not selected by chance or imagination, but in every case are carefully-executed reproductions of those that were present round the individual nest. When it has been

BRITISH MUSEUM (NATURAL HISTORY).

First Floor.



Second Floor.



Scale of Feet.

THE DANGERFIELD PRINTING CO. LONDON.



possible, the actual rocks, trees or grass, have been preserved, and where these were of a perishable nature they were accurately modelled from nature. Far more care has also been taken in preserving the natural form and characteristic attitude of the birds than was formerly the case in museums, as a large number of the old specimens in the wall-cases unhappily testify. This beautiful and instructive series is still in process of formation. Among the most attractive cases are, near to the entrance to the gallery, on the right, a pair of Puffins, feeding their single young one, and Black-throated Divers, with their eggs in a hollow in the grass on the edge of a mountain-loch in Sutherland. Hen-harriers, the male grey and the female brown, with their nest among the heather from the moorland of the same county. A Peregrine Falcon's nest, on the ledge of a rocky cliff, containing three white downy nestlings. Various species of Ducks, especially the Red-headed Pochard, on the sedgy border of a Norfolk mere. This is in the sixth recess on the left side. A nest of the Heron, in a fir-tree, with the two old and three nearly fledged young birds. Various species of Gulls, and a particularly beautiful group of the graceful Arctic Terns from the Shetland Islands, in the seventh recess on the right. Then follow Plovers, Sandpipers, Snipes, &c., some of which (especially the Ringed and Kentish Plovers) show the wonderful adaptation of the colouring of the eggs and young birds to their natural surroundings for the purpose of concealment. Beyond are Ptarmigans and Capercaillies from Scotland, and on the left Woodpigeons and Turtle Doves building their simple, flat nests of sticks in ivy-clad trees. In the Pavilion at the end are Sandmartins and Kingfishers, showing, by means of sections of the banks of sand or earth, the form and depth of the hole in which the nests are placed; and the nests of the Swift, Barn Swallow, and House Martin, all in portions of human habitations. There is here also (on the right) a fine group of Gannets and other sea-birds from the Bass Rock in the Firth of Forth. On the opposite side of the Pavilion have recently been added two important groups, with the accessories true to nature, of the Golden Eagle and Common Buzzard, from Scotland.

Owing to want of space in this gallery, the series of

nests of the Perching or Passerine birds is continued across the Coral Gallery, into the middle portion of the Reptile Gallery.

Parallel with the bird gallery to the north side (right on entering), and approached by several passages, is a long narrow gallery containing the collection of corals and of sponges and allied forms. Commencing at the eastern end, some of the lowest forms of animal life are exhibited in the wall-case and table-cases; they belong to a group called PROTOZOA, and, for the greater part, are so minute, that they can be studied with the microscope only; their structure is therefore illustrated by means of models and figures. The next divisions of the gallery are occupied by the sponges; most conspicuous among them is a series showing the variations of the common bath-sponge (cases 1 and 2), the beautiful siliceous *Euplectella* or Venus' flower basket, the Japanese *Hyalonema* or glass rope sponge (case 3), and the gigantic *Rhaphiophora* or Neptune's goblet, of which several specimens are placed on separate stands.

Nearly the whole of the remainder of the gallery is given up to the Corals, showing the immense variety of form and colour of these animals, some presenting a marvellous resemblance to vegetable growths. The part exhibited is merely the dried, hard, horny or calcareous basis or supporting skeleton either of isolated individuals, or of colonies of creatures allied to the well-known sea-anemones of our coasts. The aggregated skeletons of myriads of these animals form the coral-reefs which constitute the base of thousands of islands in the Indo-Pacific Ocean. Near the west end of the gallery is placed a magnificent specimen of the Black Coral of the Mediterranean (*Gerardia savalia*), one of the *Antipatharia*, which was obtained off the coast of the island of Eubœa in the Ægean Sea. The drawing in the case shows a magnified view of the polypes of this species as they appear in life. In case 13 are specimens and drawings of the Red Coral (*Corallium rubrum*), so largely used for ornamental purposes, and also of the crimson Organ-pipe Coral (*Tubipora*). Arranged on shelves on the south wall of the western end of this gallery, is a series of *Pennatulidæ* (sea-pens, sea-rushes, or sea-ropes) preserved in spirit. They live at the bottom of the sea, with their lower end fixed in the sand and

mud, and their skeleton is never more than a straight internal axial rod.

Two table-cases at the western end of the gallery contain the POLYZOA, a group of small animals which, like corals, are supported by a calcareous or horny plant-like growth, but in their internal structure are more nearly related to the *Mollusca*, a class exhibited in the adjoining gallery. Many fine specimens of this group, as well as others exhibited in this gallery, were obtained on the exploring voyage of H.M.S. "Challenger."

Approached through the Coral Gallery, and running backwards at right angles with it, are various galleries containing other portions of the zoological collections.

I. The Fish Gallery, which is nearest to the Central Hall, **Fish Gallery.** contains the exhibited portion of the collection of Fishes, the greater number of which, preserved in spirit, are placed for safety in a detached building behind the Museum, where they are available for study under suitable regulations. The gallery contains stuffed examples and skeletons of all the most remarkable members of the class, the peculiarities of which are pointed out in a special guide-book.*

The wall-cases on the west side of the room (right on entering) and at its end contain the fishes with completely osseous skeletons, a division to which belong by far the greater part of the species now inhabiting the waters of the globe. Large and remarkable examples are placed in separate cases opposite to the wall-cases; and as the colours of fishes are very fugitive, and disappear more or less completely after death, some of the stuffed examples have been painted from life, to show the extraordinary brilliancy of many of the tropical kinds. The fishes allied to the Perch (case 1), Gurnard (case 8), Mackerel (case 10), Sword-fish (case 13), Wrasse (case 15), Codfish and Plaice (case 17), Catfish (case 18), Salmon (case 21), Pike (case 22), Eel (case 23), are represented by numerous examples, the last of which is that, at least in external form, most remarkable fish, the Sunfish or *Orthogoriscus*.

The eastern or left side of the room is devoted to the exhibition of a very different division of fishes, which was much more numerous represented in ancient times than at present. The

* 'Guide to the Reptiles and Fishes.' Price sixpence.

majority have a cartilaginous skeleton. To this division belong the Gar-pike of North America (case 28), the Mud-fishes (*Dipnoi*) of South America, Africa and Australia (case 28), the Sturgeons (case 29), and finally the Sharks and Rays, including the singular Hammer-headed Shark, and the Saw-fish (*Pristis*), which has a long projecting flattened snout, with a row of teeth arranged something like those of a saw on each side. Of this form, a remarkably large specimen from the coast of British Guiana (*Pristis perrotteti*) is exhibited. Another very small division of fishes comprises the Lampreys, of which a few specimens are shown in case 44.

The largest specimen of the class, placed near the centre of the room, suspended from the roof, is a full-grown example of the Great Basking Shark (*Selache maxima*) which was captured on the 2nd of March, 1875, near Shanklin, in the Isle of Wight. Its length is twenty-eight feet, but, as the minute size of the teeth indicate, it is a comparatively harmless animal. Beyond it is a young specimen of a shark (*Rhinodon typicus*) which when adult is said to attain a still larger size. It inhabits the Indian and Pacific Oceans. In the passage between the Fish Gallery and the Bird Gallery a large table-case is placed containing a selection of the most important forms of Batrachians, which are divided into such as possess a tail—Salamanders and Newts, and into those without tails—Frogs and Toads. These animals live during some period of their existence in the water, when they breathe by gills, and are therefore very closely allied to fishes.

Insect Gallery. II. A small gallery is devoted to the group of ARTICULATA or Invertebrated animals with jointed limbs, as Insects, Spiders, Myriopods, and Crustacea. In the wall-cases are many curious examples of nests, and of specimens illustrating the ravages of destructive insects, and also some of their economic products. Selected examples of the different groups of insects are exhibited in systematic order in the table-cases, so as to give the visitor who studies them a general idea of all the most interesting forms and of their classification. Unfortunately, it is impossible to exhibit many of the most beautiful and rare species, owing to the deteriorating effects of continued exposure to light upon their colours. The main collection of insects is, on this account

and because of the immense space it would otherwise occupy, kept in cabinets in the "insect-room" on the basement floor, to which students can have access under the regulations which will be found at the end of this guide.

Against the wall on each side of the gallery are models showing the injuries caused to vegetation by insects and mites; also models of various forms of galls of general or scientific interest.

III. A large gallery containing the collection of stuffed specimens and skeletons of Reptiles, including Crocodiles, Lizards, Snakes and Tortoises. As is the case with the fishes, very many of the animals of this class are necessarily preserved in spirit, and therefore not suitable subjects for exhibition. The gallery contains examples of all the forms of general interest, for an account of which the visitor is referred to the special guide.* Reptile
Gallery.

The middle portion of the floor of this gallery is devoted to a portion of the collection illustrating the nesting habits of British birds (see p. 40). The specimens placed here all belong to the order of Passeres or Perching birds. At the further end are fine groups showing the nests of the Rook, Hooded Crow and Carrion Crow.

IV. A small gallery is called the Star-fish Gallery, from being specially devoted to Star-fishes and their allies—the ECHINODERMATA; these are arranged systematically in table-cases 1-6, and in case 7 there are specimens illustrating the anatomy of the skeleton, and models and figures descriptive of the remarkable changes undergone by these animals in the course of their development. As magnificent examples the visitor should not fail to observe in 1 D *Pycnopodia helianthoides*, and in 2 B and C the fine series of *Linckia*, and in 2 D-F and 3 A the extensive collection of *Pentaceros*; in 3 E are two remarkable specimens of *Astropecten*; in 4 C an almost complete example of the brittlestar (*Ophiomastix annulosa*) should be noticed, and on the tops of cases 5 and 6 are good examples of *Diadema* and *Echinus*. In a separate case on the east side of the gallery is *Luidia savignii* from Mauritius, one of the largest known kinds of star-fish. The most beautiful and remarkable speci-

* 'Guide to the Reptiles and Fishes.' Price sixpence.

mens in the gallery are the stalked Crinoids, which were collected by the "Challenger," and one found attached to an old telegraph wire which was taken up in the Caribbean Sea. These deep-sea forms, so abundant in earlier periods of the world's history, are exhibited on tables in the corners of the gallery, by case 7.*

The wall-cases contain types of the very various and different groups which are put together as Worms or VERMES. Case 1 contains the Tape-worms or Cestoda, and the Flukes or Trematoda, the life history of a type of each being illustrated by specimens, figures, and models; in case 2 the Round-worms are illustrated by models of *Trichina*, and the anatomical structure of various other forms is shown by the aid of diagrams. Case 3 contains the free-living Terrestrial and Marine Worms, the Leeches, and Gephyreans. Case 4 is devoted to specimens of Echinodermata preserved in spirit, especially Holothurians, or sea-slugs and sea-cucumbers.

Shell Gallery. V. A large gallery is devoted to the extensive division of MOLLUSCA, the exhibition of which is however mainly restricted to their shells. In some cases the form of the animal itself is shown either by specimens in spirit or by means of models.

The collection, at present under rearrangement, is contained in four parallel rows of table-cases, the arrangement commencing on the right as the gallery is entered. The first two rows contain the marine forms of Gastropods—a division which includes Snails, Slugs, Whelks and all those Molluscs which crawl upon the under surface of their bodies. The Cones, Volutes, Mitras and Murices are some of the most attractive groups. The two rows of cases on the left contain the land-shells, Bivalves and Cephalopods. The Cockles, Oysters, Clams, Piddocks, Teredos, Scallops and Ark-shells represent some of the principal types of Bivalves, so called on account of their shells being formed of two pieces or valves. A Giant Clam on the floor of the gallery weighs 310 lbs. The Argonauts, the beautiful pearly Nautilus, the Octopus, Squids and Cuttlefishes are the chief kinds of Cephalopods.

* 'Guide to the Shell and Star-fish Galleries (Mollusca, Echinodermata, Vermes).' Price fourpence.

A fine series of very large shells and some interesting Cephalopods in spirit occupy four upright cases at the south end of the room; and along the sides of the gallery are placed some small table-cases, containing series of the eggs of Mollusca and of their opercula or lids, by means of which the opening or mouth of the shell is closed in some forms; also specimens illustrating the formation of pearls, and other special points of interest connected with the group.

A special guide-book to the Shell and Star-fish galleries is published for the use of visitors.

GALLERY OF CETACEA.

Approached by a staircase, leading from the last (or western-most) of the passages which connect the bird gallery with the coral gallery, is a room in the basement, in which the specimens of whale-like animals, for which, on account of their large size, no other place could be found in the portion of the Museum galleries already completed, are placed. The room has, unfortunately, the disadvantage of being not well lighted, and of being intersected by massive columns, which interfere with the complete view of any of the larger skeletons; nevertheless the specimens will be safely*preserved in it, until the erection of the west front shall afford them better accommodation, and visitors can, in the meantime, with very little difficulty study most of the important peculiarities of these gigantic and very interesting members of the Animal Kingdom.

Cetacea or
Whale
Gallery.

As it is almost impracticable to preserve the skins of the larger species of whales, owing to the quantity of oil with which they are saturated, the exhibition of the characters of these animals is chiefly limited to their skeletons, assisted by drawings of their external forms. The general appearance of many of the smaller kinds is, however, shown by stuffed specimens and coloured casts. A general account of the structure and classification of the Cetacea, with special reference to those exhibited in this gallery, will be found at the end of the Guide to the Galleries of Mammalia.*

* 'Guide to the Galleries of Mammalia (Mammalian, Osteological and Cetacean) in the Department of Zoology.' Price sixpence.

**Fresh-water
Dolphins.**

On the left side of the door, on entering, near the window, is a case containing a stuffed specimen, skeleton, and several skulls of the very curious fresh-water Dolphin of the rivers of India (*Platanista gangetica*), and in the next case the peculiar Dolphin of the river Amazon (*Inia geoffrensis*). Among the specimens on the same side of the room, one of the most interesting, on account of its remarkable dentition, is the Narwhal or Sea-Unicorn. It has only two teeth, which lie horizontally in the upper jaw. In the female both remain permanently concealed within the bone of the jaw, so that this sex is practically toothless; but in the male, while the right tooth remains similarly concealed and abortive (as shown in the specimen, by removal of part of the bone which covered it), the left is immensely developed, attaining a length equal to that of half the entire animal, projecting horizontally from the head in the form of a long, straight, tapering and pointed tusk, spirally grooved on the surface. In some very rare cases both teeth are fully developed, as in the fine skull exhibited near the skeletons.

Narwhal.

**Whalebone
Whales.**

Most of the largest Cetacea belong to the group called "Whalebone Whales," in which a series of horny plates called "baleen," or more familiarly "whalebone," grow from the palate in place of teeth, and serve to strain the water taken into the mouth from the small marine animals on which the whales subsist. A fine representative of this group is the very perfect skeleton of the Common Rorqual or Fin-whale (*Balænoptera musculus*) near the further end of the middle of the room. It is sixty-eight feet long, and was captured in 1882 in the Moray Firth, Scotland. The flukes of the tail and dorsal fin are preserved with the skeleton and suspended in their natural position, and the small pelvic bones and a rudimentary nodule, representing the femur or thigh bone, the only trace of the hind leg of this gigantic animal, are also preserved. Beyond this skeleton is a skull of the Greenland Right-Whale (*Balæna mysticetus*), which yields most of the "whalebone" of commerce, and also a small wooden model of the animal, of the scale of one inch to the foot.

FIRST FLOOR.

The upper floors of the wings of the Museum consist only of single galleries extending along the whole front of the building; the galleries which run backwards on the ground floor containing only a single story.

The MAMMALIAN GALLERY is entered from the western corridor of the Central Hall. It contains the series of stuffed specimens of animals of this class, with the exception of the *Cetacea*. The gallery is at present undergoing a complete re-arrangement, and as its contents, as well as those of the next, are described in considerable detail in a special guide, a very short notice here will suffice.

Gallery of
Stuffed
Mammals.

The series commences on the left with the most highly organised forms, viz., the apes and monkeys, of which the fine series of Gorillas, Chimpanzees and Orang-Outangs deserves special attention. Among the Carnivora which occupy the cases next in order will be noticed the series of Tigers (cases 13 and 14), including the small and long-haired Persian race, and the large short-haired form of the jungles of Bengal. Typical forms of the Bats (such as the Flying Fox), of the small Insect-feeders and Gnawing Animals, and of the Edentata (Sloths, Anteaters and Armadilloes) follow. The remainder of the cases of this side of the gallery, of the pavilion, and nearly the whole of the right side are devoted to the Ungulata or Hoofed Animals; very complete series of the wild Sheep, Goats and wild Cattle, of the Musk-ox an inhabitant of the Arctic regions, of the large African Antelopes, and of the Elk and Reindeer of both hemispheres are exhibited. Towards the end of the series, in cases 95-98, the Pouched Mammalia or *Marsupialia* (Kangaroos, Wombats, Tasmanian Wolf, Opossums, &c.) find their place; they carry their young in a pouch, until able to shift for themselves. Finally the Monotremes of Australia, the Duck-billed Platypus, and the Echidna differ still more from the ordinary members of this class, inasmuch as they do not bring forth their young alive, but lay eggs.

SECOND FLOOR.

**Skeletons and
Skulls of
Mammals.**

The Osteological Gallery is devoted to the skeletons and skulls of Mammalia, the arrangement of which corresponds, as far as practicable, with that of the stuffed specimens. The series commences (on the left hand on entering) with a male and female human skeleton, followed by a selection of skulls, showing the different modifications of the cranial and facial bones in the various races of Mankind. Among these is the skeleton of a full-grown Akka, only four feet high, which appears to be the usual size of this pygmy tribe of Negroes from Central Africa. The next wall-case contains several skeletons of man-like Apes, the Orang-Outang, Gorilla and Chimpanzee, with the principal forms of the other Monkeys and Lemurs. In cases 4-8 numerous representatives of the Carnivorous and Rodent Mammalia are shown, the remainder of the cases of this side of the gallery being devoted to the exhibition of skulls of the larger Ungulata, viz., the Elephants, Rhinoceroses and Horses. Of the first many skulls are exhibited, some in section showing the extraordinary modification of the skull in adaptation to the support of the heavy tusks and powerful trunk.

The majority of the cases on the right hand of the gallery are occupied by the Ruminant Ungulata, such as the Camels, Oxen, Antelopes, Sheep, Goats and Deer; cases 23 and 24 containing skeletons and skulls of Sirenia, the Edentata (Sloths, Anteaters, Armadilloes), the Marsupials or Pouched Mammalia, and finally the Monotremes of Australia (*Ornithorhynchus* and *Echidna*), which in their skeleton as well as other structures differ widely from the ordinary members of the class.

Along the centre of the gallery is ranged a very complete series of skeletons of the wild cattle of the old and new world, and of the various species of Rhinoceros and Hippopotamus. Among the former is a fine skeleton of the large Burchell's Rhinoceros (*R. simus*), of which the skin is mounted in the gallery below. There are also skeletons of the African and Indian elephants, the latter being a very large example of the tuskless variety or *Muckna*.

EAST WING.

GROUND FLOOR.

The ground floor of this wing consists, as on the other side of the building, of a gallery running west and east the whole length of the wing in front, of a smaller parallel gallery behind it, and leading from the latter, a series of galleries running north and south. The whole of this floor is occupied by the collection of the remains of animals and plants which flourished in geological periods anterior to that in which we are now living. Some of these belong to species still existing upon the earth, but the great majority are extinct. They are arranged mainly upon zoological principles, that is, the forms which are believed to have natural affinities are placed together, but within some of the great divisions thus mapped out, especially of the Invertebrata and plants, it has been found convenient to adopt a stratigraphical or even geographical grouping, the fossils of different geological formations being kept apart, and those of the British Isles separated from those of foreign localities.

As this portion of the Museum is fully described in the Illustrated Guides,* it will only be necessary to give a brief account of it here.

The large front gallery first entered from the hall is entirely devoted to the remains of Mammalia. Along the centre are placed a number of large and striking objects, of too great a size to be contained in the wall-cases. The first is a nearly complete skeleton of the American Mastodon, an animal closely allied to the elephant, from which it is chiefly distinguished by the characters of its molar teeth; followed by a skeleton of the existing Indian elephant, placed here for comparison with the extinct species of that genus. Beyond this is the skull of an Elephant (*Elephas ganesa*), remarkable for the immense length of its tusks, from the Siwalik Hills of India, and another of the Mammoth (*Elephas primigenius*) with huge curved tusks, in a

Remains of
extinct
Mammals.

* 'Guide to the Exhibition Galleries of the Department of Geology and Palæontology.' Part I. Mammalia and Birds; price sixpence. Part II. Reptilia and Fishes, Northern Galleries; price sixpence.

perfect state of preservation, found in the brick earth at Ilford in Essex. Then follow skeletons of the great extinct Irish Deer (*Cervus giganteus*), male and female, the former distinguished by its magnificent palmated antlers, resembling those of a fallow deer on a large scale.

Here has lately been placed, through the liberality of Professor O. C. Marsh, a model of a perfect skeleton of the *Uintatherium* or *Dinoceras mirabile*, one of the most remarkable of the many wonderful forms of animal life lately discovered in the Tertiary beds of the western portion of the United States of America. This animal combines in some respects the characters of a rhinoceros with those of an elephant, and has others altogether special to itself. The group to which it belonged became extinct in the Miocene period, without leaving any successors.

Beyond this is a skeleton of a very rare and interesting animal, the Northern Manatee or Sea Cow (*Rhytina gigas*), the last known resort of which was Behring's Island in the North Pacific, where it was completely exterminated towards the close of the last century. In the same case is placed the skeleton of a smaller allied form, the *Halitherium*, from the Miocene of South Germany. These, with their existing representatives, the Manatee and Dugong (see Osteological Gallery, West Wing, Second Floor, p. 45), belong to the order *Sirenia*, aquatic mammals of fish-like form, presenting considerable external resemblance to *Cetacea* (the Whales and Dolphins), although differing from them in many essential points of structure and habit.

Fossil remains
of Man.

The wall-cases on the south side (right on entering) contain remains of Man found under such circumstances as may justify the appellation of "fossil," in caves or in Pleistocene deposits, associated with the bones of animals either completely or locally extinct. Then follow in systematic order the bones and teeth of the other Primates, the Carnivora, Ungulata and *Sirenia*.

The greater part of the north side of the gallery is devoted to the exhibition of a magnificent collection of the remains of Proboscidea (*Dinotheria*, Mastodons and Elephants), including the fine series from the sub-Himalayan formations of India collected by Cautley and Falconer.

In the pavilion, or large room at the end of the gallery, are skeletons and bones of the animals of the order Edentata, mostly from South America, including some fine specimens of the great Ground Sloths, the largest of which is the *Megatherium*, shown in the act of rearing itself on its hind legs and powerful tail to seize and tear down the branches of a tree, in order to feed upon the leaves. That this was the habit of this huge animal is clearly indicated by the structure of the bones and teeth. The mounted specimen is not an actual skeleton, but is composed of plaster casts of the real bones, most of which are in the wall-case at the north side of the room. Of the *Myiodon*, a smaller, but nearly allied species, an almost perfect skeleton is exhibited in a glass case near the *Megatherium*, and not far off is the *Glyptodon*, a huge extinct Armadillo, enclosed in a solid barrel-like bony case. As these animals far surpassed in size their diminutive existing representatives, so the gigantic Australian Marsupials of the corresponding period (Pleistocene, or latest Tertiary), the *Diprotodon* and *Nototherium*, remains of which will be found in this room, greatly exceeded any of the species now existing on that continent. On the other hand, all the mammals of the earliest geological periods of which remains are known, are of diminutive size, as seen in the very interesting series, mostly from the Purbeck (Upper Oolite) beds of Dorset, and Stonesfield (Great Oolite) of Oxfordshire, exhibited in the centre window-case on the east side of the room.

The south side of this room (right on entering) is chiefly devoted to the remains of extinct birds, including the famous Lizard-tailed Bird (*Archæopteryx*) of the Solenhofen beds of Bavaria, the oldest known member of the class, presenting many reptilian characters, but with well-developed feathers on the wings and tail, the impressions of which are beautifully preserved in the specimen. A series of skeletons of the "Moa," or *Dinornis* of New Zealand, a bird in which no trace of a wing has been discovered, show the diversity of size of different members of the group, some far exceeding any existing ostrich and others scarcely larger than a good-sized turkey. Some of these remains are so recent as still to be covered with dried skin, and even feathers. Several eggs are also shown; but, large as these are, they are greatly exceeded in size by those of the

Extinct Birds.

Aepyornis from Madagascar, in the south-east corner of the room. Some remains of large extinct birds from Patagonia have also been added to this gallery.

**Extinct
Reptiles.**

The long gallery north of the mammalian saloon contains a fine assemblage of Reptilian remains. The south side is devoted to the Great Sea-Lizards (*Plesiosauria* and *Ichthyosauria*), mostly from the Lias formation. A nearly perfect skeleton of *Plesiosaurus* from the Oxford Clay is mounted in a case near the west end of this gallery. Ranged in the cases on the north side are remains of the gigantic *Dinosauria*, which far exceeded in size any other land-animals. A mounted plaster cast of a complete skeleton of an *Iguanodon*, found (with many others) at Bernissart in Belgium, is a conspicuous object in the middle of the room. The original from which it was taken is in the Brussels Natural History Museum. At the eastern end of the gallery are the *Pterosauria*, or Flying Reptiles. At the west end is the nearly complete skeleton of *Pariasaurus* from the Karoo formation (Trias) of South Africa, one of the most remarkable fossil reptiles yet obtained.

**Extinct
Fishes.**

Of the galleries running northwards from this, the one nearest the centre of the building is devoted to the collection of fossil Fishes. The next contains the Cephalopods, a group of animals abounding in extinct forms, of which the Belemnites and Ammonites are the best known. The form and structure of their nearest living representatives, the various species of Cuttle-fishes, Squids, Argonauts and Nautilus, are illustrated by models and drawings and specimens, placed near the entrance of the gallery and along the top-line of the wall-cases. The third gallery contains the remaining Molluscs and Brachiopods; the Echinoderms, Annelids and Crustacea; the fourth, the Corals, Sponges, Protozoa, and Fossil Plants. In these last two galleries the British specimens are placed in the table-cases, and those of foreign origin in the cases round the walls.

**Extinct
Invertebrates
and Plants.**

**Historical
Collections.**

The fifth gallery is set apart for the reception of certain special collections of historical interest, which, from the circumstances under which they were formed, or came into possession of the Museum, or from their containing a large number of types described and figured in standard monographs, it has not been thought desirable to break up and disperse among the

general collection. The principal of these are, the original collection formed by William Smith, the pioneer of geology in this country, the Searles Wood Collection of Crag Mollusca, the Edwards Collection of Eocene Mollusca, the Davidson Collection of Brachiopoda, the types of Sowerby's 'Mineral Conchology,' and lastly, but not least in interest, the specimens which, belonging to the collection of Sir Hans Sloane, form the nucleus of the whole Museum.

In the wall-cases on the west side of this gallery is exhibited a stratigraphical collection, showing the most characteristic rock-specimens, often with their included organic remains, representing the various geological formations of the British Isles, arranged in the order of their sequence in time, commencing near the entrance door with the most recent, and gradually passing down to the most ancient fossil-bearing strata. Along the top of the case is displayed a running section of all the sedimentary rocks of England in the order of their succession, each bed being distinctively coloured, and named to correspond with the actual specimens placed beneath. On the east side are exhibited additional specimens of marine reptiles from the Lias and a series of foot-prints of reptiles from the Trias of N. America and the New Red Sandstone of England, &c.

Stratigraphical collection of British Palæontology.

FIRST FLOOR.

The gallery on this floor, entered from the south end of the east corridor of the hall, contains the extensive Mineral Collections, a fuller description of which will be found in the special guides.*

Gallery of Minerals.

Entering the gallery the visitor will find, in the first window-case on the left-hand side, a series of specimens selected and labelled to serve as an introduction to the study of minerals. Beginning with a definition of what is meant by a *Mineral*, it shows how essential characters were gradually recognised, and how minerals have been distributed into kinds and classified. In the next three window-cases specimens are arranged to

Introductory Collections.

* 'Guide to the Mineral Gallery.' Price one penny. 'Introduction to the Study of Minerals, with a Guide to the Mineral Gallery.' Price sixpence.

illustrate the characters of minerals and the various terms which have been found useful in their description.

Rocks.

In the remaining six window-cases on the same side of the gallery, a corresponding series of specimens illustrative of the *Characters of Rocks* is exhibited; and the eleven window-cases on the opposite side contain a collection illustrating the various *Kinds of Rocks*.*

General Collection of Minerals.

In the table-cases of the gallery are exhibited specimens of every mineral species and variety preserved in the Museum. The cases containing this General Collection are numbered from 1 to 41, and the eight panes of each case are distinguished by the letters *a* to *h*. For the use of the student there is published an Index to the names and synonyms of all the mineral species and varieties represented in the Collection, with references to the table-cases in which specimens are placed.†

The system of classification, which is necessarily constructed to include, not only ores, but all known minerals, is not very easy for a general visitor to follow, and it is thus convenient to indicate here the positions in the gallery of those minerals—as, for instance, precious and ornamental stones, and metallic ores—which have an interest for all; for detail, reference must be made to the Departmental Guide.

I. In cases 1 and 2 are the native metals, as Copper, Silver, Gold, and Platinum; and non-metals, as Sulphur, Graphite, and Diamond. The large symmetrical crystal of Diamond, weighing 130 carats, presented by Professor Ruskin, is worthy of special attention (case 1g).

II. The next six cases contain minerals which have mostly a metallic lustre and consist of metals in chemical combination with elements of the sulphur or arsenic groups.

Argentite (3d) is an important silver ore, containing 87 per cent. of silver and 13 of sulphur.

Blende (4b) is a valuable zinc ore, and contains 67 per cent. of zinc and 33 per cent. of sulphur.

Galena (4e) is by far the most important ore of lead (lead 87, sulphur 13).

* 'Introduction to the Study of Rocks.' Price sixpence.

† 'The Student's Index to the Collection of Minerals.' Price twopence.

Copper-glance (3e) is an important ore of copper (copper 80, sulphur 20). General
Collection of
Minerals.

Cinnabar (3h) is the ore from which mercury or quicksilver is obtained (mercury 87, sulphur 13).

Pyrites (5d), one of the most common of minerals, is a compound of iron and sulphur (iron 47, sulphur 53).

Erubescite (5e), Copper pyrites (5f), and Tetrahedrite, or Grey Copper ore (7a), are all valuable copper ores.

III. Common salt is represented in case 8f, and Fluor, a compound belonging to the same division, begins at case 7e.

IV. The next division consists of compounds of oxygen and includes most of the stony minerals:

Cuprite (10a), an important ore of copper (copper 89, oxygen 11), is at first ruby-red in colour, but is blackened by exposure to light.

Spinel (10e), in its transparent varieties, is one of the precious stones: the deep red is the Spinel Ruby (less dense and less hard than the true ruby), the rose-tinted is the Balas Ruby, and the yellow or orange-red is the Rubicelle of the jewellers: sometimes, too, it has a dark blue colour. On account of their hardness the less valuable specimens are used for the jewellery of watches.

Magnetite, or Magnetic iron ore (10f), is the richest and most valuable of the ores of iron, of which metal it contains 72 per cent. It is the natural loadstone.

Chrysoberyl (9e) is another of the precious stones. The beautiful greenish-yellow variety, almost equal in lustre and hardness to the sapphire, is the Oriental Chrysolite of the jewellers; another variety, with a peculiar play of light, is the true Cat's-eye; while a third, green by sunlight but red by candle- or lamp-light, is the stone known as Alexandrite.

Corundum (9h), when clear and of the proper colour, is, after the diamond, the most precious of stones. When pure it is the colourless variety known to jewellers as the Lux-sapphire: but with very minute traces of colouring ingredient it assumes the richest and most varied hues; when red it is the true Ruby; when azure it is the Sapphire; while the yellow, green, and purple varieties are known respectively to jewellers as the Oriental Topaz, Emerald, and Amethyst; the prefix "oriental," though

at first used to suggest that the stones are not the ordinary topaz, emerald, and amethyst, but others of a similar colour coming from the East (India, Ceylon, Siam, Pegu, &c.), was afterwards understood to imply only the excellence of their characters. The Star-stone, another variety of corundum, when placed in a strong light shows a six-rayed star.

Hæmatite (11a) is a valuable ore of iron.

Cassiterite, or Tin-stone (11f), is the ore of tin, of which metal it contains 79 per cent.

Zircon (13b), when clear and without flaws, is one of the precious stones: one variety with peculiar red tints is the Hyacinth or Jacynth, while the colourless, yellowish, and dull green are termed Jargoon: the colourless variety, owing to its high refractive power, approaches even the diamond in brilliancy.

Quartz is the most common of minerals. In its clear and transparent variety it is the Crystal of the ancients and the rock-crystal of modern times; it is the Brazilian Pebble of the spectacle-makers (14b). After the clear come the smoky varieties, including the Scotch Cairngorm and Occidental Topaz (14g). Next comes the Amethyst (14h), one of the less valuable, though one of the most beautiful of the ornamental stones. The Quartz Cat's-eye (13f) is a variety presenting the opalescence, but not the hardness or the brilliancy, of the true Cat's-eye already referred to: the opalescence is due to enclosed fibres of an asbestos-like mineral in the specimens from Ceylon, and to fibres of crocidolite in the blue, and of altered crocidolite in the brownish-yellow specimens from South Africa.

Jasper (13g) is not a simple mineral, but a coloured mixture of silica and clay, distinguished from ordinary quartz by its opacity and dull earthy fracture. It is of various colours, chiefly red, brown, yellow and green; and the colours are arranged sometimes in a nodular form as in the Egyptian Jasper, at other times in stripes as in the Riband Jasper.

The Lydian- or Touch-stone (15a), by reason of its hardness and black colour, has been used from remote ages to test the purity of the precious metals.

Hornstone (15a) is a variety of silica without evident crystallisation, and generally presents a more or less splintery

fracture; but in one kind, Flint (15b), the fracture is conchoidal, sometimes conical, as is well shown by specimens in the case. General
Collection of
Minerals.

Chalcedony (15b) has a lustre nearly that of wax, and is either transparent or translucent. The specimens from Uruguay (15d) are of especial interest as containing imprisoned water.

The Heliotrope, or Bloodstone (16a), is a green stone with red blood-like spots.

Next follow the Plasma and Chrysoprase, green stones: and the Sard, generally a brownish red; as also the Sardonyx, its banded variety: all of them much prized by the ancients because, though hard and tough enough to resist ordinary wear and tear, they are more suited to the display of the engraver's skill than are the harder and more precious stones.

Then come the Agates (16b), chiefly formed of thin layers of porous chalcedony of different colours, though the material of many of the white layers is a compact semi-opal. Most of the specimens are now brought from Uruguay, in South America, and are cut and polished at Oberstein, in Germany, where in former times agates were got in quantity from the mountains of the district. Sometimes the layers are plane and parallel, and the stone is then an Onyx, useful as a material for cameos: or the bands of a section are arranged in parallel sets of zigzag lines, and the stone is then called a Fortification-agate: but in the ordinary agate the layers are variously curved.

The Moss-agates, or Mocha-stones (16e), are varieties of chalcedony, enclosing moss-like forms of oxides of manganese and iron and green earthy chlorite.

The Carnelian (16e) is a beautiful stone much valued by the engraver: its fracture has a peculiar waxy lustre, and is distinct from that of the Sard, which is dull and horn-like.

Next follows the Opal, including the Precious or Noble Opal (16f), among the specimens of which is a fine suite from Queensland, presented by Professor Story-Maskelyne, F.R.S.

The carbonate of barium Witherite (18a) is much used in the manufacture of plate-glass and in France in that of beet-sugar.

Strontianite (18b), the carbonate of strontium, is the mineral from which most of the strontium nitrate is made for use in the

**General
Collection of
Minerals;**

manufacture of fire-works, owing to the fine crimson colour which it gives to the flame: it is also much employed in the process of sugar refining.

Cerussite (18b) is the corresponding carbonate of lead, and when abundant is a valuable ore of the metal.

Calcite (18e), carbonate of calcium, is represented by an extraordinarily fine suite of specimens, illustrating an almost endless variety of crystalline form. The clear mineral from Iceland is largely used in optical instruments for the polarisation of light.

Chalybite, or Spathic iron ore (20h), is the carbonate of iron, and is a most valuable ore of the metal. The most important English iron ore, Clay iron-stone, is a mixture of chalybite and clay.

Calamine (19h), carbonate of zinc, is an important zinc ore.

Chessylite (21d) and Malachite (22b) are respectively the blue and green hydrated carbonates of copper, and are ores of that metal. Malachite is found in large masses; and by reason of the high polish which it takes and its beautiful markings, is much used for ornamental work of various kinds.

Passing to the silicates we come to Olivine (22f), one of the less hard and least valued of the precious stones; when of a yellow colour it is known as the Chrysolite, while the pistachio-green variety is the Peridot of jewellery.

Hiddenite (23a), a rare emerald-green variety of spodumene, discovered a few years ago at Stony Point, in North Carolina, has been introduced as a precious stone.

Asbestos (24c) is a variety of hornblende used in the arts; it is found in long fibres, and in some of its varieties is so flexible that it can be woven into gloves and other articles. The term asbestos, unquenched or unquenchable, was applied to the mineral by the ancient Greeks, because, owing to its being unaltered by heat, wicks made of it were used in maintaining the sacred perpetual fires of their temples. Napkins of asbestos were cleaned by being thrown into the fire; asbestos cloth was also used in the process of cremation to keep the ashes of the body distinct from those of the fuel. It is now largely employed for more prosaic purposes,

such as the lining of iron safes, packing for steam-pipes and boilers, and in gas-stoves; for these purposes its low conductivity for heat renders it very serviceable.

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Jade or Nephrite (24d), a much valued mineral, belongs to the same mineral group as hornblende. The various shades of colour and the beautiful polish which this tough mineral will take are illustrated by specimens in the case. The worked specimens from New Zealand, of which there are several exhibited, are now rare. An immense water-worn mass, found some years ago in Asiatic Russia, is shown in the Pavilion.

Meerschaum (23g) is the light soft porous mineral used for tobacco-pipes: it is a hydrated silicate of magnesium.

Serpentine (25a) is another hydrated magnesium silicate: the ease with which it is worked and takes a good polish, its green colour, and varied markings render it much sought for as a material for fire-places, tables, and other indoor work: exposed to the weather it soon loses its polish. Only specimens illustrating the purer forms of the mineral are shown in the case.

Topaz (25d) in its clear varieties is one of the precious stones. The crystals from the Urulga river, in Siberia, are remarkably fine examples of crystalline development; they are of a delicate brown colour, but are kept covered, as the action of light speedily bleaches them. The yellow crystals from Brazil assume a peculiar pink colour when heated, and are then known to jewellers as Burnt or Pink Topaz.

Garnet also belongs to the group of precious stones; when the red is tinged with violet, the stone is the Almandine or the Syrian garnet (named after Syriam in Pegu), and when cut *en cabochon*, the Carbuncle of jewellery (26f); the Cinnamon-stone or Hessonite is yellow (26e); the Pyrope and the Bohemian garnet are blood-red (26e); Uvarovite is a green chrome-garnet (26h).

Jadeite (27a) is one of the green stones which, under the name of jade, are wrought into ornaments in China: from jade, however, it is distinguished by its chemical composition, structure, and higher specific gravity.

Among the specimens of Epidote (27c) a remarkable suite from the Untersulzbachthal is exhibited.

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Collection of
Minerals.**

Mica (28a) is the name given to a group of minerals differing much from each other in chemical composition and optical properties, but having as a common character an easy cleavage in a single direction, and thus affording plates remarkably thin, transparent, tough, and elastic. One of these minerals, muscovite (28d), has been used in Russia in place of glass for windows; it is now in common use for lanterns and stoves, not being so easily cracked as glass by change of temperature: it is often known in commerce as talc, a term formerly applied to it by mineralogists, but now restricted by them to a different mineral.

The group of Felspars, the most important of the rock-forming minerals, begins at case 28f.

After the Felspars comes Beryl, of which the bright green variety, Emerald (29c), is one of the most valued of precious stones. It was in ancient times worked in Egypt, as is proved by the rough specimens found in the old workings by Sir Gardner Wilkinson, and presented by him to the Museum. Emeralds are found in the Urals; but the locality for the finest stones has long been that of Muso, about seventy miles from Santa Fé de Bogotá, in South America. Lately emeralds, though not of a good colour, have been discovered at Stony Point in North Carolina: some of the best of those found are shown in the case. Facetted specimens of the colourless beryl, and also of the bluish-green beryl, known in jewellery as Aquamarine are exhibited (30a).

In cases 30e to 32d will be found beautiful illustrations of the Zeolite group of minerals.

Tourmaline (33a), when free from flaws, is, in some of its varieties, to be classed with the precious stones. Among these is the pink variety called Rubellite. Two very fine specimens of rubellite from Ava are shown in the case; one of them, remarkable for its size and shape, was brought from that country by Colonel Symes, to whom it had been presented by the king; the other, not so large but of a deeper colour, was presented to the Museum by Mr. C. S. J. L. Guthrie. The pink-and-green tourmalines from Maine, U.S.A., are among the more beautiful of the mineral products of the United States. Good examples of the blue tourmaline, Indicolite, are shown in case 33b.

A rich blue mineral product, the Lapis Lazuli of jewellery (34b), is brought from Persia, China, Siberia, Bokhara, and Chili; it is a mixture of various species. When powdered, lapis lazuli furnished the once costly pigment ultramarine; through the discovery of a method of producing an artificial and cheap form of the same material, the use of the mineral as a pigment has almost ceased.

The sulphates of strontium, Celestite (35c), of barium, Barytes or Heavy Spar (36a), and of lead, Anglesite (36e), are all represented by long series of specimens.

Gypsum or Selenite (36f) is the hydrated sulphate of calcium: when heated it gives up its water of crystallisation and falls to a white powder, known as "Plaster of Paris"; when moistened the powder again combines with water and yields a coherent solid. A magnificent crystallised specimen, a gift from the late Prince Consort, will be found in the Pavilion. Gypseous alabaster is a massive variety of gypsum (36h); owing to its whiteness, fine texture, and softness, it is largely used as a material for statuettes and other indoor ornaments; the Oriental alabaster is a harder substance, stalagmitic calcite, the carbonate of calcium.

Borax (37c) is a hydrated borate of sodium. It is much used as a flux, also in the process of soldering, and in the preparation of easily fusible enamels. It was formerly carried over the Himalayas from a lake in Thibet, but is now obtained largely from borax lakes of the United States, and is extensively prepared from the boracic acid of the lagoons in Tuscany.

Nitratine or Soda nitre (37d) is found in Chili in beds of large extent; it is largely used for the preparation of nitric acid and of saltpetre, and as a fertiliser.

Calaite or Turquoise (38g) is a hydrated phosphate of aluminium; it owes its blue or green colour to the presence of small quantities of salts of copper and iron. Being as hard as felspar and taking a good polish, it has been much prized in jewellery under the name of Oriental Turquoise; that which comes into the market is chiefly brought from the turquoise mines, not far from Nishapur, in Persia.

As a supplement to the collection of simple minerals, there is arranged, in case 41, a group of natural substances which

**General
Collection of
Minerals.**

either belong or are closely related to the Mineral Kingdom, although in their formation organised matter has played a very important part. The most important members are Coal and Amber.

Coal (41a), in most of its varieties, gives structural evidence of its vegetable origin: its chemical composition depends on the more or less complete change which has taken place, and is thus not so definite as in the preceding minerals. In the variety called anthracite all traces of the original organised structure have disappeared.

Amber (41c), in ancient times regarded as one of the precious stones, is likewise of vegetable origin. It is a fossil resin, chiefly derived from trees allied to the existing pines: its originally viscous condition is sufficiently proved by the insects which are sometimes found enclosed in it.

**Larger
Mineral
specimens.**

In the Pavilion at the east end of the gallery the visitor will find many specimens which, owing to their size, cannot be satisfactorily exhibited in the table-cases.

Of these we may specially call attention to the magnificent series of minerals in the wall-cases, and to the specimens of galena and jade on separate tables: also the large specimen of gypsum or selenite, presented by the late Prince Consort, which, with some fine illustrations of calcite, is exhibited in a special case.

Of the four table-cases in the windows, the first three contain a series illustrating the various kinds of pseudomorphs, and the fourth a set of specimens arranged by Professor Ruskin to illustrate some varieties of Silica.

Meteorites.

The most important feature of the Pavilion is the Collection of Meteorites,* of which the smaller specimens are shown in the four central cases.

The fall of masses of stone and iron from the sky, though observed again and again since the most remote ages, was very rarely credited by anyone beside the spectators themselves; and till the beginning of this century no attempt to collect such specimens for examination and comparison was made. In the special guide it is shown how evidence of the actual fall of such

* See 'An Introduction to the Study of Meteorites, with a List of the Meteorites represented in the Collection.' Price sixpence.

bodies at length became irresistible, and a description is given of the striking circumstances attending their fall, of their general characters, and of their chemical composition: illustrative specimens, collected together for easy reference, will be found in one of the cases. It is also shown that meteorites are closely related, not only to the ordinary shooting stars, but also to comets, and probably to the nebulae and fixed stars.

SECOND FLOOR.

The upper floor of the East wing is devoted entirely to the Department of Botany.

The Collections of this Department consist of two portions, Botanical
Gallery. the one open to the public and consisting of specimens suitable for exhibition, and intended to illustrate the various groups of the Vegetable Kingdom and the broad facts on which the Natural System of the classification of plants is based; the other set apart for the use of persons engaged in the scientific study of plants.

The natural system of classification is followed in the exhibition cases in the public gallery. System of
Classification. The series of specimens begins with the Natural Order *Ranunculaceæ*, and the Orders are represented in this and the following cases by dried specimens of the plants themselves, coloured drawings, fruits, and prepared sections of the woods. Diagrams are employed to indicate the characters in the flowers on which the grouping is based. The use of the same colour for homologous structures throughout the diagrams readily conveys to the eye the points of agreement or difference on which the classification rests. The geological history of each Natural Order is indicated on a table of the earth's strata; and its present distribution on the surface of the earth is given on a small map of the world. Descriptive labels give particular information respecting each specimen.

The dicotyledonous plants extend to the fifth case on the left side of the gallery, and are followed by the Monocotyledonous Orders, which fill a portion of the last case on the same

side, the two half cases at the end of the gallery, and the first case returning towards the door. The Gymnosperms are placed in the next case. Then follow the Cryptogams, a case being devoted to the higher vascular Orders, and another to the cellular plants. The series closes with an interesting collection of models of the larger British Fungi prepared by Sowerby when he was engaged on his work on this group of plants, which have been recoloured and mounted in accordance with their natural habitats by Mr. Worthington G. Smith. A Catalogue of these models has been prepared.* In the table-case in this last bay there is an illustrated collection of the British Mycetoza prepared by Mr. Arthur Lister and Miss G. Lister, to which a *Guide* has been written by Mr. Lister.† A large chalk-like mass of Diatomaceous earth containing twelve billion diatoms is placed in a case by itself near the entrance to the gallery. The table-case in the first bay on the left contains an exhibition of Insectivorous plants, illustrated with models and drawings representing their structure. It is intended to devote the other table-cases to similar exhibitions of plant adaptations.

At the end of the gallery the larger specimens of Palms are set up against the screen dividing the gallery from the herbarium; and the Cycads, Tree-ferns, etc., are placed in the bays next the appropriate wall-cases. Suspended from the roof is a fine specimen of the "Wabo" Bamboo (*Dendrocalamus Brandisii* Munro) from Burmah, 81 feet long.

A collection of British Plants is exhibited in glazed frames fastened by hinges to uprights, and placed in the corners of the gallery. The classification is that used by Bentham in his 'Handbook of the British Flora,' and his descriptions are attached as labels to each plant. Three series of frames contain specimens of all the British Vascular Plants. The fourth frame is occupied with a complete series of the Mosses, and forms the beginning of the exhibition of Cellular Plants. The series is continued in the frames on the other side of the gallery containing the lower Fungi and drawings of the larger Fungi by

* 'Guide to Sowerby's Models of British Fungi.' By W. G. Smith. Price fourpence.

† 'Guide to the British Mycetoza,' by A. Lister. Price threepence.

Mr. W. G. Smith. These plants could not be dried so as to give a fair idea of their form; faithful coloured drawings have therefore been employed for this part of the series.

The portion devoted to the use of the scientific student consists mainly of the great Herbarium of Vascular Plants. This is a collection of plants, fastened on single sheets of folio paper, representing, as far as it has been possible to obtain them, first, every species of plant living on the earth, and then the distribution of each species on the surface of the earth. The various species are collected under their respective genera, and these are arranged in their Natural Orders; the whole are systematically classified, beginning with the *Ranunculaceæ*, and going down to the Vascular Cryptogams. The Herbarium of Cellular Plants (Mosses, Liverworts, Algae, Lichens and Fungi) is in a separate room entering from the head of the staircase in the hall.

The foundation of this great Herbarium was the collection of Sir Joseph Banks, consisting of the plants obtained by himself and Dr. Solander in their voyage round the world with Captain Cook, and of numerous series from all quarters of the globe presented to him or purchased by him. He bequeathed all his botanical collections to the Trustees of the British Museum in 1820, reserving to Robert Brown, in whose charge they had been for years, the use of them during his lifetime. Mr. Brown transferred them to the Trustees of the Museum in 1827, and was appointed the first Keeper of the Department. The yearly additions since 1827 have been so extensive that the Banksian Collections form now but a small proportion of the whole Herbarium. In a brief notice it is impossible to give a correct idea of the richness of this Herbarium. Among the principal collections contained in it may be mentioned those of Clayton, Roemer, Miller, Brown, Bowie and Cunningham, Gardner, Nuttall, Horsfield, König, Martin, Masson, Wilson, Hampe, Broome, Seemann, Welwitsch, Salt, Miers, Hance, and Triana. It includes also authentic specimens received from Loureiro, Gronovius, Tournefort, Jacquin, Aublet, Ruiz and Pavon, Perrottet, and many others.

There is a separate Herbarium of British plants, based on the collections formed by Sowerby in the preparation of his great

Herbarium.

Historical
Collections in
the Her-
barium.Sir Joseph
Banks.Herbarium of
British Plants.

work, 'English Botany.' This is, perhaps, the largest and most interesting public Herbarium of British plants, and its value is constantly increasing by additions from botanists who make the British Flora their special study.

**Sloane's
Herbarium.**

The extensive Herbarium formed by Sir Hans Sloane became the property of the nation in 1753, along with his other collections. The plants gathered by himself in Jamaica formed the nucleus of this Herbarium, and to them were added the collections of Petiver, Buddle, Plukenet, Kaempfer, Kamel, Merrett, Boerhaave, Vaillant, Banister, and others. According to the practice of the time these plants were fastened on the leaves of large folio volumes, of which there are altogether 310. This collection had been placed in the library of the British Museum, and remained there until the establishment of the Department of Botany, when it was transferred to the care of Mr. Brown. The plants are well preserved, and are catalogued in a copy of Ray's 'Historia Plantarum,' kept beside them, so that they can be easily consulted.

The collections formed by Hermann in Ceylon (from which Linnaeus prepared his 'Flora Zeylanica'), with annotations by both Hermann and Linnaeus, are preserved in five volumes, four containing plants, and the fifth consisting of drawings.

**Ray's
Collection.**

The department also contains the singularly interesting and valuable collection of plants gathered in 1663 by John Ray in his travels in Europe, a catalogue of which was published in his account of the journey in 1673.

In these various Herbaria the Museum possesses an unrivalled series of historical collections from the middle of the seventeenth century to the present time.

**Collections of
Fruits, Seeds,
and Woods.**

Besides the collection of dried plants forming the Herbarium, there are two allied collections arranged in the same gallery in parallel series. The one is the collection of fruits and seeds occupying the table cabinets in the centre of the gallery, and the other the collection of woods placed in the smaller cabinets in the centre of each bay. The position of the cabinets has permitted the arrangement of the specimens belonging to these two collections in close proximity to the Natural Orders in the great Herbarium, to which they belong. The student can thus easily command the specimens in the three collections in the

prosecution of his investigations. Nor is the facility of reference confined to the mounted and finally arranged specimens, for the method in which the unmounted collections are arranged and temporarily stored in small rooms behind the great Herbarium provides for their ready consultation, even though they may not yet be incorporated in the Herbarium itself.

The student receives assistance in his investigations from the **Library**. extensive Library of the Department, and from a large collection of plates and drawings of plants systematically arranged in the same order as the plants in the Herbarium.

The collection of original drawings comprises specimens of **Original Drawings of Plants, and Manuscripts.** the work of many botanists and of the principal botanical artists, such as Kamel, Ehret, J. Miller, Nodder, Aubriet, Sidney Parkinson, J. R. & G. Forster, Jacquin, Masson, Sowerby, Salisbury, Schomburghk, Fitch, Schleiden, W. G. Smith, and especially Francis and Ferdinand Bauer; and a large collection of drawings of Chinese and Indian plants.

The department possesses also many valuable manuscripts, such as those of Robert Brown, Solander, Ruiz and Pavon, König, Salisbury, and Miers, referring to plants now in the Herbarium on which these botanists have worked.

The cellular plants are accommodated in a large room in the **Cellular Plants.** Central Tower approached by a staircase, the entrance to which is on the left side of the statue of Sir Joseph Banks. The Mosses include the collections of Wilson, Hampe, Drummond and Spruce; the Liverworts contain the herbarium of Hampe; with the Lichens are incorporated collections made by Carroll, Spruce and Weddell. The Algæ contain the herbarium of Prof. Dickie, the Diatomaceæ of Kützing, Greville and Deby, and collections from Harvey, Robert Brown, Shuttleworth, &c. The extensive series of Fungi, including collections from various botanists, has been increased by the bequest of the valuable herbarium of the late Mr. C. E. Broome.

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1881	..	..	..	..	231,284
1882	..	..	..	..	278,027
1883	..	..	..	..	277,331
1884	..	..	..	..	375,231
1885	..	..	..	..	421,350
1886	..	..	..	..	382,742
1887	..	..	..	..	358,178
1888	..	..	..	..	372,802
1889	..	..	..	..	361,046
1890	..	..	..	..	355,682
1891	..	..	..	..	375,906
1892	..	..	..	..	351,917
1893	..	..	..	..	408,208
1894	..	..	..	..	413,572
1895	..	..	..	..	446,737

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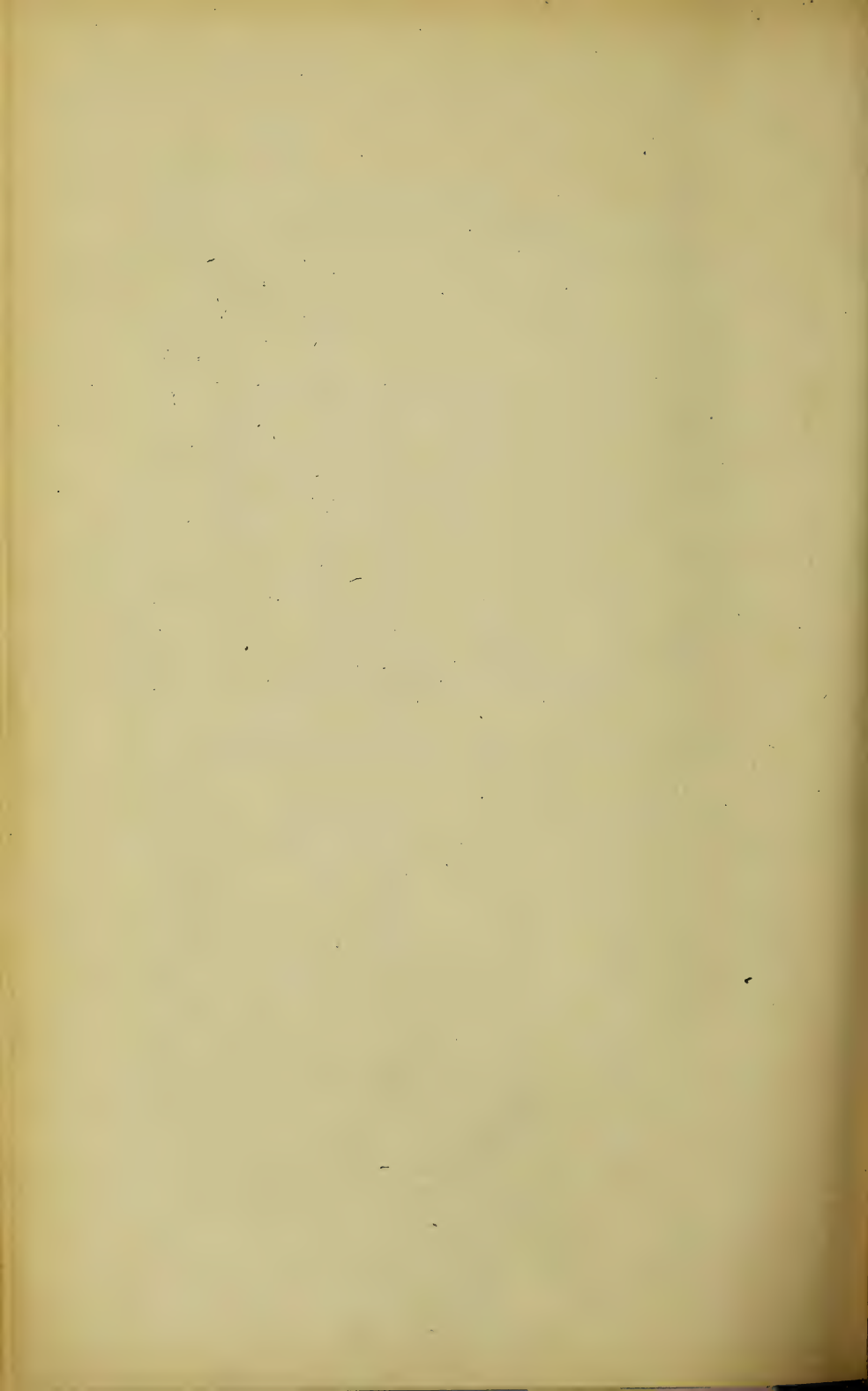
	Zoology.	Geology.	Mineralogy.	Botany.
1883	5,229	2,453	617	1,023
1884	6,818	1,991	651	993
1885	8,313	1,959	626	1,105
1886	8,372	2,466	761	1,026
1887	8,955	3,290	620	1,483
1888	8,797	3,111	733	2,214
1889	8,360	3,339	683	1,344
1890	9,034	3,771	623	1,244
1891	9,443	2,961	946	2,226
1892	10,932	4,107	1,751	2,585
1893	10,872	4,955	1,714	2,274
1894	10,730	5,176	1,994	2,129
1895	8,189	5,986	2,073	2,206

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